McGraw-Hill
Publishing Company, Inc.
James H. McGraw, *President*
Mason Britton, *Vice-President*

American Machinist

*Editors*
Kenneth H. Condit
Fred H. Colvin

Volume 68 New York, June 21, 1928 Number 25

# What Modern Equipment Has Done

*One of a series of articles giving the actual results achieved by replacing obsolete with up-to-date equipment*

## Shop No. 4

## *Miehle Printing Press & Manufacturing Company*

As Told to K. H. Condit
*Editor, American Machinist*

IT OUGHT to be obvious that manufacturing costs can be reduced by modernizing the production equipment, but it is not so easy to prove it by specific examples in a small-lot shop as it is in a mass-production plant. The work done in the plant of the Miehle Printing Press & Manufacturing Company is distinctly in the small-lot class. The shop organization is much like that of any other good contract shop.

Notwithstanding the limitations of small-lot production the management of the company is firmly convinced that it pays to buy the best production equipment available and to replace it when something sufficiently better to accomplish marked savings is offered. Something like ten per cent of the total value of the installed equipment is spent each year for replacements.

Anybody can make a killing when it comes to reducing production costs by changing the machining method. What this article attempts to prove, however, is that appreciable savings are possible if the most modern machine of a given type replaces an obsolete machine of the same type.

To show what can be done by changing methods just one instance will be cited: the replacing of hand screw machines by the best modern automatics. In this department job after job has shown a saving up to 90 per cent, and on one job the saving was 100 per cent!

Sounds fishy? Yes, but it was done by cutting out a machine altogether. A screw-slotting attachment was put on an automatic to take care of an operation formerly done on a separate machine. The operation was performed simultaneously with other operations and did not increase the length of the cycle.

But to get down to examples of the kind of saving that does not involve a change of method. One of the most striking is a 6-ft. radial drill. It replaces two 6-ft. radials not over six years old and cuts the time on the job in half.

The work is the side frame of a large printing press, one end of which is shown in Fig. 1, and in it must be drilled a number of holes of various sizes. The piece is carried on a truck that runs on rails and the former arrangement had the two radials placed side by side working on opposite ends of the frame. Each machine had its operator, and a helper divided his time between the two as he was needed. Now, one operator takes care of the whole job and uses a helper only when a heavy jig must be placed or removed. In round numbers, seven man-hours are needed now where fourteen were required with the old equipment.

It should be said, in fairness to the old machines, that the two men working on the same piece lost some time through mutual hindrance, as when one finished everything within reach and had to wait for the other before the truck could be moved.

In the planing department, old planers that had been on the job day and night for many years were replaced although they were still quite as accurate as the work required. The new machines have reduced the cost of manufacturing on the class of work they handle 20 per cent.

The modern grinding machine is much more efficient than its predecessors. For grinding relatively long rollers of small diameter, Fig. 2, the newer machine reduces the cost as much as 50 per cent. Automatic feed and traverse, higher power, wider wheel, and higher traverse speed as applied by the Miehle Company engineers combine to produce the saving. The old machine still does fairly well where only a small portion of the roller is to be ground, or where there are several body diameters to be ground, all of them short in length. In the case of intermediate lengths where the width of the wheel will

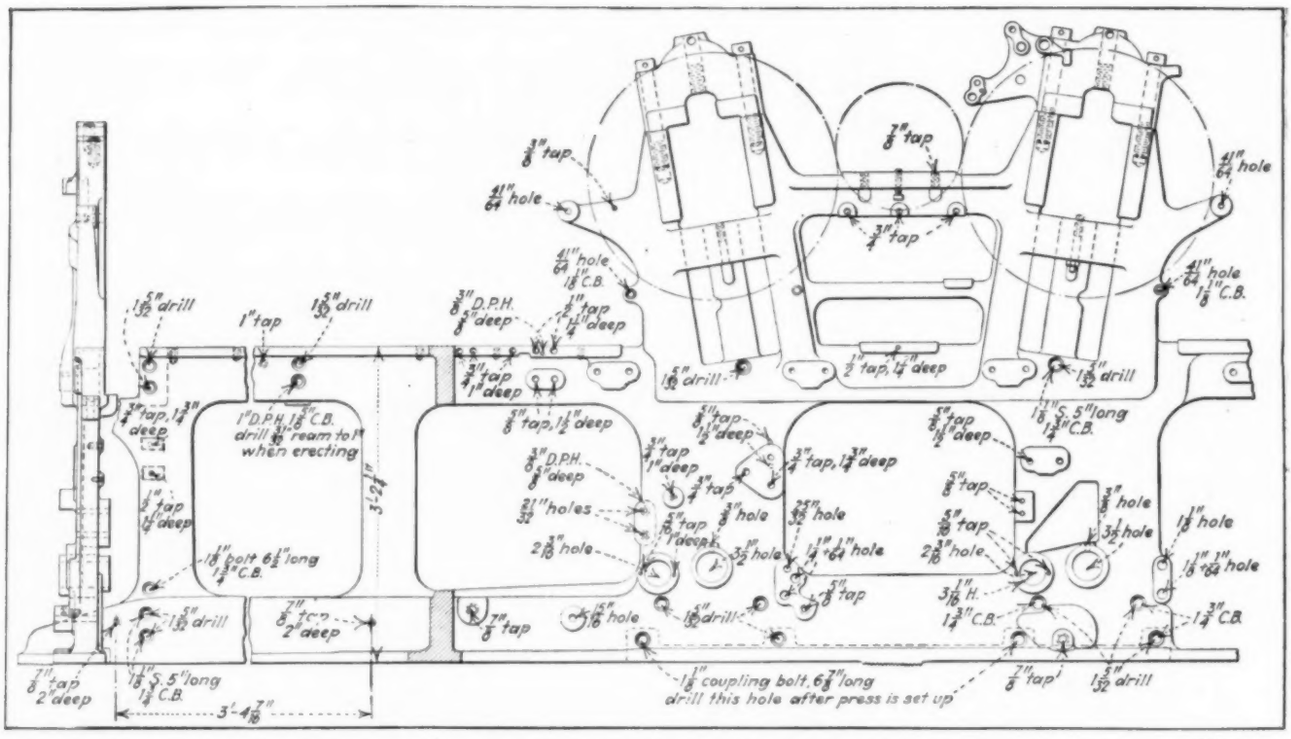



*Fig. 1—One end of a side frame for a two-color press. Drilling of the numerous holes in this portion and in the remainder, not shown, is a radial drill job that was formerly handled by two machines, side by side, two operators and a helper. The time required was 29 man-hours. A single modern radial drill operated by one man with the occasional assistance of a helper when the jigs are to be moved now takes but 17½ man-hours*

permit grinding the full surface while feeding straight in, even greater savings have been made.

Perhaps it is not altogether fair to include the centerless grinder as an example of the kind of saving under consideration, but at least the change of method is only from one type of grinding to another and the figures are impressive.

Used on short rollers, 1⅝ in. in diameter by about 2½ in. in length, the centerless grinder turns out a product that can be sold as a repair part for $0.35, at a good profit. By the old method the cost was $1.25, and the profit was hard to find.

The blacksmith shop includes the heat-treating department. Here a modern rotary gas furnace is doing work in six hours that took 24 hours in an oven-type furnace.

Over in another corner is a small bending machine that saves $200 a month. It paid for itself in three weeks.

In another department there is a small multiple-spindle drilling machine that saves at least 50 per cent on every job. A large part of the saving is apparently due to the way it speeds up the operator by setting the pace for him. And so it goes. The savings made by modern handling equipment are enormous.

Much has been accomplished by re-tooling. A modern quick-change chuck has shown such satisfactory savings that it is being used wherever adaptable.

In several instances, sad to relate, the equipment engineers have not shown the ability expected of them. One type of machine failed to meet its guaranty and the builder's experts were unable to improve it. The Miehle engineers were then turned loose on the problem, and when they finished the machines were exceeding the guaranty by 40 per cent.

With such evidence before them the men responsible for production cannot but be convinced that it pays to use only the best of modern equipment.

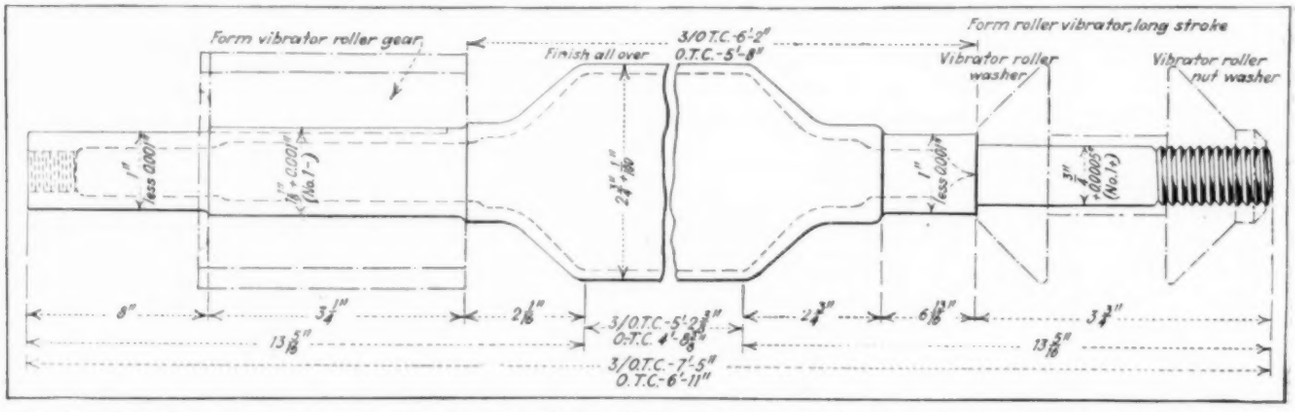



*Fig. 2—The illustration shows a form vibrator roller about 7 ft. long. Note that the horizontal dimensions are not to scale. Modern grinding equipment has reduced the time required from 155 hours per hundred pieces to 75 hours*

# Buying on Performance

A COUNCIL of war sat in the board room of the Wilson Motors Corporation. Hugh Wilson, the president, sat at the head of the table and at his right was William Holland, there by special invitation to advise on a problem that had the responsible heads of the company worried. The other men in the group were the works manager, the general superintendent, the chief engineer, the tool supervisor and the purchasing agent.

Wilson opened the argument. "What we want to know, Mr. Holland, is how to decide who is to get our drill business for the next twelve months. There is so little to choose between most of the good companies that we haven't been able to hit on any other basis than price, and I'm not satisfied that that's the right criterion to set up."

"You can't get into an argument with me on that point, Mr. Wilson," returned Holland. "In my experience, the fellow who buys on price alone usually pays the most in the end."

The purchasing agent looked uncomfortable, but he said nothing.

"That's well enough, Mr. Holland," said the president, "but what other basis is there?"

"Well, who makes the drill best suited to your purpose? Who gives you the best service? Who has the best reputation? If all three of those questions point to the same company, isn't your problem solved?"

"It would be, Mr. Holland," broke in the tool supervisor, "but, unfortunately those questions lead us to three different companies, all good."

"Um," remarked Holland, thoughtfully. "Well, here are two suggestions, coming from the experience of two different organizations, one large, the other rather small. A large corporation, for which I have done some work, had much the same question as you have. What the tool men of this outfit did was to run actual tests in several of their plants, under shop conditions, to determine which make of drill, in the various sizes most used, cut the most metal per inch of length of drill. With this figure before them, and the bids of the various makers, they were able to compute the cost of drills in metal removed. It so happened that the company whose bid was lowest did not get the order because, when the performance of its drills was taken into account, it was found to be more economical to buy from a slightly higher bidder whose product seemed to stand up better.

"The smaller company was bothered about milling cutters. The superintendent had one particular job where many cutters were used up in the course of a year. What he did was to get each cutter maker to supply what he considered was the best cutter for the job. Then he took all of these cutters and designed a compromise cutter that included the best points of the others. Each maker was then requested to make a cutter to the new specification.

"Then he put a couple of young engineers on the job to run an endurance test on all of the cutters, both of the compromise type and of the regular type supplied by each company. When the test was finished he knew a lot more about cutters, and cutter makers, than he did before.

"It is well to remember, however, that these should be actual shop tests so far as possible, using the same material that must be drilled or milled in actual use. You want to know what the tools will do in the shop."

Wilson looked impressed. "Sounds like a pretty thorough job to me, either way," he remarked. "Tell you what we'll do. You fellows get together and work out the best and quickest way to get a test on drills and report to me tomorrow afternoon. Then we'll go ahead and find out where we stand on the drill question.

"Much obliged, Mr. Holland. I hope you'll drop in when the figures are in so that you can see the results."

"I'd certainly like to," replied Holland. "Every bit of information of this kind I can gather is worth a lot to me."

---

Executives are invited to discuss the problem involved in the foregoing case. Accepted contributions will be paid for.

*(Discussion of preceding problems follows on next page)*

# EXECUTIVE FORUM

## *Discussion*

### Making Your Own Power

There is one point in connection with the problem of making your own power that seems to have been overlooked, and that is to get the right size plant for economical operation. When you install a boiler and engine of the proper size for economy, you begin to overload it if the business grows as all businesses should. If you put in a plant with 50 per cent over capacity, it is uneconomical until you grow to it. Further expansion means overload and eventually, inefficiency.

You can, of course, install small units and add to them, but the first cost is higher and the efficiency not as good. Except for cases where steam is used for processing the work or in climates where heat is required over long periods, there is hardly a question as to the advisability of buying power. Under these conditions the pros and cons must be carefully considered. But we must not overlook the point made by Mr. Holland, the time it too often takes that can better be given to problems of manufacture and design.

—I. B. Rich.

### Tipping the P. A.

I fail to see how there can be two sides to this question. Any man, either P. A. or salesman, who will in the slightest degree entertain a suggestion of tipping, has either a very superficial knowledge of business or has such an indifferent opinion of the merits of the article he is selling that he has to resort to hot air or "bunkum" to make a sale. He has primarily his own immediate interests in view instead of the standing and welfare of his employer. —Geo. M. Richards.

Few firms appreciate the importance of the purchasing agent's job. A purchasing agent should be a high-salaried official, at least a vice-president of his company, and I don't mean in the sense of the farmer who calls his hired man the vice-president in charge of cows. The purchasing agent's training should to this end, be long, thorough and highly specialized.

Purchasing agents who will accept gifts, and salesmen who will give them, are both dying out. A purchasing agent who will give you his business for a case of Scotch, will change his source of supply for two cases of Scotch, and every salesman of any intelligence knows it. Price is today only one of the factors that govern purchasing. Every modern purchasing agent is an analyst who can isolate all of the factors that govern value in his individual case and consider them in their correct proportions. And every modern salesman is likewise an analyst who can present these factors in a way that makes their consideration easy, accurate, and pleasant enough so that taking action on them follows as a matter of course. Edwin L. Cady, *General Manager.*

The purchasing agent who is willing to make his employer pay for the presents and entertainment given by a gift-bringing salesman is a great liability to the company that employs him. The purchasing agent will find many salesmen waiting to buy his business. These salesmen seem to have the idea that the entertainments and presents are necessary if they expect to get the business.

The salesman who gets orders by giving the purchasing agent presents is inviting doubtful comment on the quality of the product he is selling. Some salesmen feel that they cannot mix with the buyer unless they show him attention in the form of presents. Goods should be bought first of all on quality and past performance. The aim of the purchasing agent should be to secure the lowest price, most favorable terms, and most adequate service consistent with the most satisfactory quality. Salesmen will find that they can get the confidence and good will of the buyer better by finding out what he actually needs to meet the demands of the trade than by giving presents. —A. Davidson.

### About Wage Incentives

I think there are not many plants in Europe where workmen would accept the so-called Halsey premium plan. The reason why the men in our plant would not accept the plan is given by the fact that the piece rates fixed by a well-managed department permit no great time-savings. The time-savings in our shop lie between 10 and 15 per cent over the given rates. If the worker earns 20 per cent or more, we do not cut the piece rate, but we change the method, and from this the men only see the endeavor to correct our working methods. Of course, we set our rates with the possibility for time earnings, but we calculate with the greatest speeds and feeds possible, and only in the time for handling the job is there a chance for our best men. We have found it better to correct the general working conditions in our shop than to try any particular premium system.

—Franz Bermann, *Austria.*

If there were more of the determination to give a square deal, we should hear less of the friction and mistrust between firms and their employees than we do today. Admitted there are

problems associated with the change over from one system to another, let us look at them a minute. First, and maybe most important, we should require someone to fix the prices or time allowances on the various jobs. A man of sound practical experience and with an abundance of tact is essential, and a good plan is to call the men together, get this man to speak to them and explain thoroughly what it is proposed to do. Assure them that there is a possibility of increased earnings, and very few will be found to object. Having done that and introduced the new system, almost inevitably the problem of high earnings will bring the desire to cut time allowances.

—T. H. HARGRAVE.

## How Can I Regain "Dull Time" Overhead?

It would be unfair, as well as impractical, to attempt any readjustment of prices on a basis of varying percentages of overhead expenses during dull times in business. Any adjustment that would take care of dull time overhead would have to be upward, and this, in a period of stagnation, would mean the loss of orders. While an equivalent adjustment for boom times might be practicable, since it would merely tend toward a price cut, it would nevertheless, be poor practice under most conditions. Where a business is subject to fluctuations in volume, the ideal method consists in setting aside any margin over and above a set profit, acquired during boom times as a fund upon which to draw during dull times. But it is admittedly a singularly fortunate manager who can "get by" his directors with a program of this sort.

—D. C. WRIGHT.

## Getting Ideas from the Men

The best suggestion system is to prescribe definite nominal prizes to be paid monthly. A small plant may have only one such prize a month, a large plant may have three. The five best ideas in any one month not receiving a prize are automatically entered in the next month's competition. If an idea is good, and there are not five better non-prize winners to replace it, it can carry over again until it either wins a prize or is displaced by five better ideas. This eliminates the possibility of a good idea losing out because it was submitted in a month of exceptional ideas. A particularly meritorious idea may receive an additional award over and above the prize money, but this is purely voluntary on the part of the management, and the men will not ordinarily expect it, but will look to the established prizes as their reward.

—ERNEST E. LAIB.

There is no reason why a well-planned suggestion system should not prove a paying proposition. The failure of so many suggestion systems can be attributed mainly to the fact that the management did not make adequate compensation for accepted suggestions. If the men see that the firm they are working for is earning thousands of dollars as a result of their mental and physical labor, while paying them a mere pittance, they become resentful and settle down to giving their employer just as little as possible and still hold their jobs. There is no dodging the fact that most men will react in this way. A suggestion scheme, to be successful, must include a cash reward, based on the saving effected. In most cases, however, the saving on a suggestion should not be calculated over a period of more than one year. Beyond that, new methods, new designs, and changes in schedule make the saving uncertain. A flat reward can be given for any idea on which an actual cash saving cannot be calculated.

—M. GLICKMAN.

A suggestion system will secure for the company the benefits of the ideas and the brain work of the employees. However, the success of a suggestion system depends upon its being pushed by the management, and on the assurance given the workman that fair play will be used. In making awards for the suggestions, the size of the award should be in proportion to the value of the suggestion. Giving an award of five dollars for an idea that saves the company a thousand dollars a year will not be very conducive to the success of the suggestion system. However, the worker should be made to understand that suggestions become valuable only after they have been improved and made workable through the efforts of the company.

—J. GURWITCH.

## Interesting the Men in the Shop

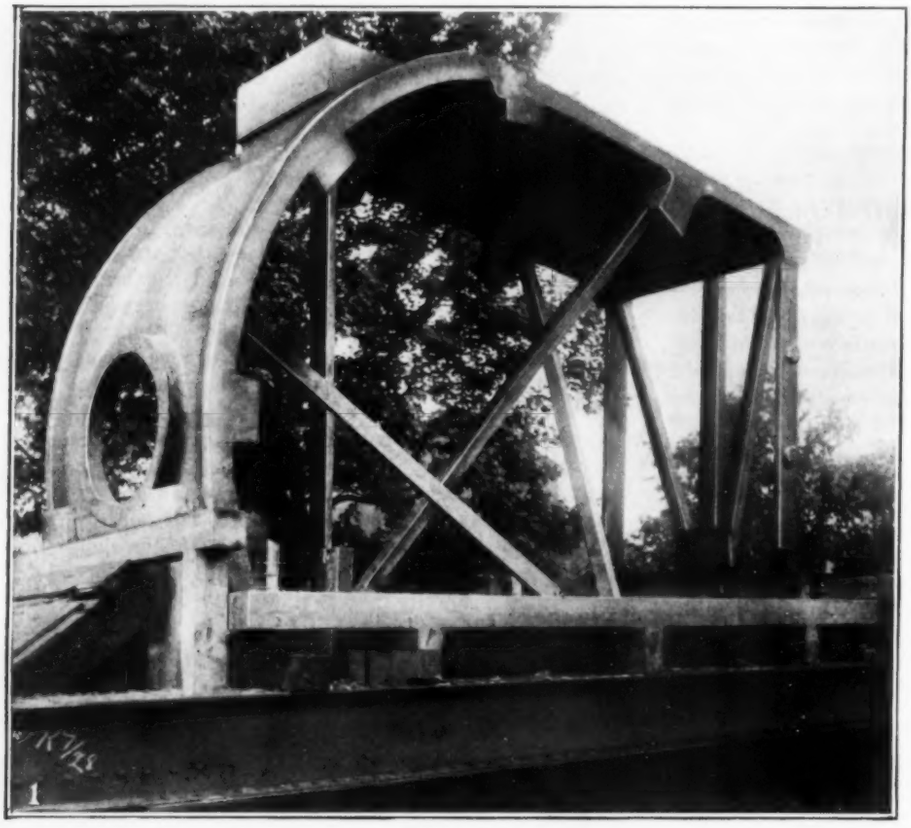
A shop paper offers a valuable means of getting certain necessary messages over to the workers by dressing them up with human interest, personal anecdotes, and pictures, until they become as interesting as fiction. Properly edited, the employees' paper will carry enough personal matter pertaining to the groups so that employees will read it. Moreover, matter of this sort has a distinct value in making the different groups acquainted with each other, and of putting the plant more on a friendly basis. Personal items should also be extended to include mentioning any distinct service which an employee has rendered to the company, whether it is the suggestion of an economy measure, the betterment of a manufacturing process, or any other accomplishment. Mention of this sort stimulates to further performance, as nothing promotes endeavor more efficiently than recognition.

One of the most important things for the editor to remember is that he should be the censor, and not the author of all the contents of the magazine. Every department head should see that interesting items are furnished from his department each month. The variety of material thus secured and the angles from which it is written offer plenty of interest-creating news.

—HARRY KAUFMAN.

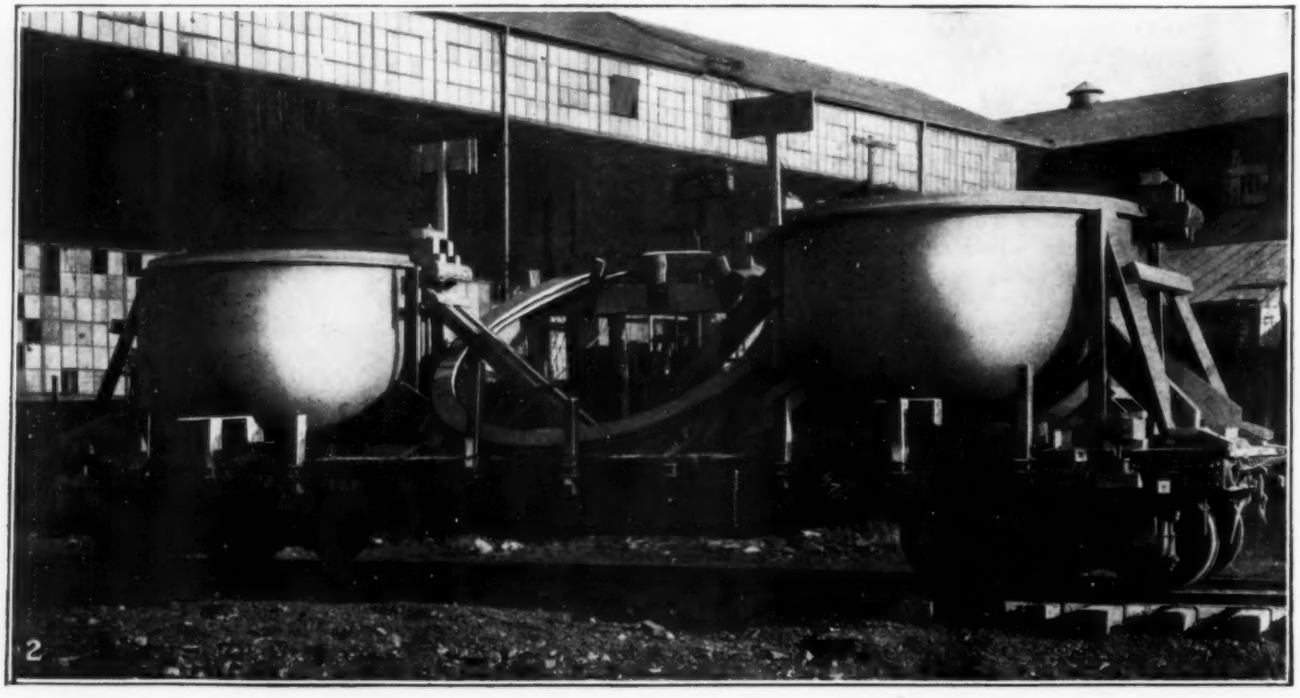
# *Packing Heavy Machine Parts for Shipment by Rail*

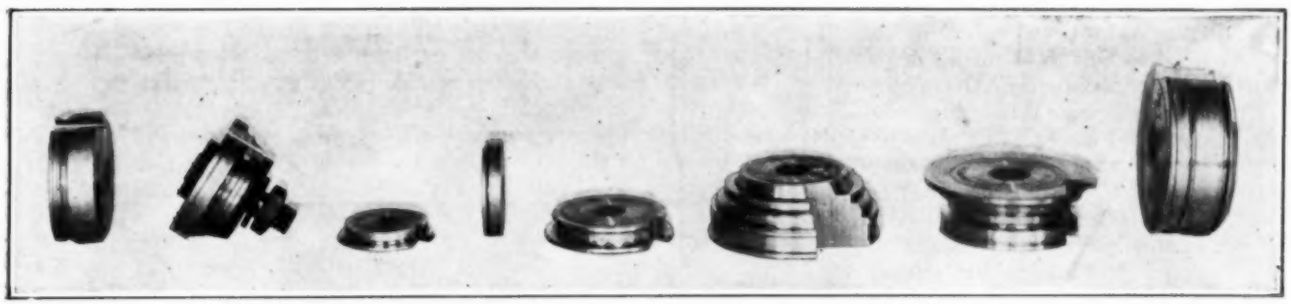
Photographs by courtesy of the Birmingham Machine & Foundry Company and the Hardie-Tynes Manufacturing Company




Handling in transit often determines the limiting sizes of machine parts. Manufacturers of heavy machinery have also learned by experience that it pays to spend money and time to prevent castings from breaking due to the continuous jarring of the freight cars en route. The condenser frame shown at the left is 15 ft. in diameter and weighs 20 tons. It had to be shipped 700 miles over lines where the tunnel clearance above the rail was only 15 ft. 9 in. The piece is shown dropped through the floor of the flat car to within 6 in. of the rail which left 3 in. clearance for tunnel roofs.

The cast-iron pots illustrated below measure 10 ft. inside diameter by 7 ft. deep, and weigh 16,000 lb. each. The 11-ft. diameter supporting rings in the center of the car had to be well braced against jarring as the cross-section of the casting was only 8 in. by 3 in. thick.





# The Form Grinding of Circular Form-Tools

By Ellsworth Sheldon

## Getting the machine and wheels ready to grind a contour—Measuring functions of the machine used to form the wheels and to transfer their shapes to the work

SO THAT the reader may comprehend more fully how advantage is taken of the precision measuring features of the machine to facilitate the work of grinding form tools, the contour, Fig. 16, is presented, and the steps necessary to grind it are followed through progressively. The contour is not the facsimile of a known tool, but is rather a fanciful outline designed to include many of the problems which the prospective grinder of form tools will be called upon to solve.

The sketch is dimensioned as would be a bonafide drawing, giving full diameters as for a finished tool, as well as the longitudinal spacing of the several shoulders, angles and curves. The graduated micrometer dial on the cross-feed screw of the machine reads in diameters of the work — not actual movement of the wheelslide—hence no correction factor in this respect need be carried in mind. When a tool comes to the grinding machine, it has already been formed in a lathe and presents the same outline and appearance as it will after being ground, except in the matter of color. It will have been mounted and trued up on one of the special mandrels, and be ready to go on the centers of the grinding machine as soon as a wheel has been prepared for it. There is a grinding allowance ranging from 0.008 to 0.015 in. left on all tools.

It is regular practice to grind all tools twice, first going over the contour with comparatively soft, free-cutting wheels and leaving 0.001 in. or less to be taken off in a second—duplicate—operation with finer grained wheels of a somewhat harder grade. If the contour is an especially difficult one, or if more than ordinary accuracy is required, the tool may be ground a third time. Ordinary accuracy means within one-half thousandth of an inch of the drawing dimensions. For the first series of operations, which includes grinding all parallel surfaces to diameter and facing all shoulders that can be reached without a specially dressed wheel, a 60-K disk wheel $\frac{3}{8}$ in. thick is placed on the end of the wheel spindle to the operator's right, the wheelhead is set to zero and the wheel is dressed

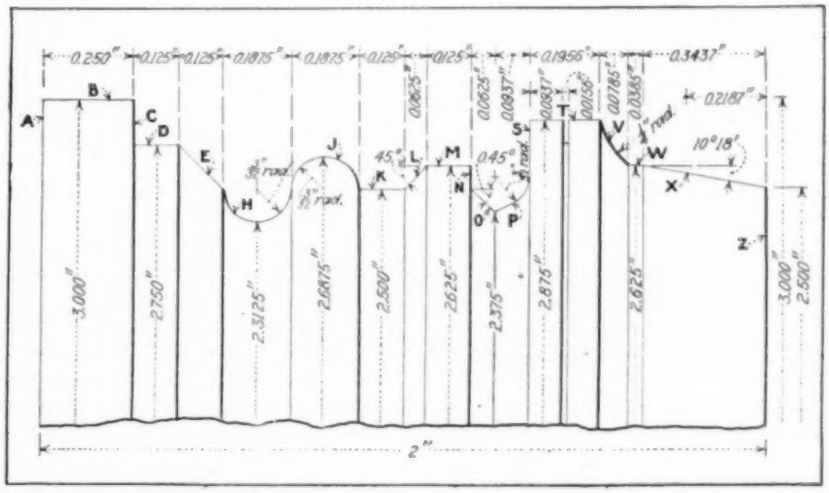



*Fig. 16—To assist the reader in understanding the method of forming the various shapes on the grinding wheels and transferring them to the work with the aid of the measuring features of the machine, this contour is presented and the operations are followed through in the text*

The fourth of six articles. The fifth will appear in an early issue.

as in Fig. 17. The wheelhead is now swiveled upon its vertical axis in clockwise direction to about 42 deg., thus bringing a corner of the wheel over the table. Since this setting will not be disturbed until all of the diameter grinding has been done, the exact angular position of the wheelhead is not of particular importance; the object is now mainly convenience of application. The reason for setting to 42 deg. instead of 45 deg. is that in one of the following stages there is a 45-deg. shoulder that should not be touched by the wheel. A portion of the periphery is dressed parallel with the line of traverse as at *a* in Fig. 18, while a somewhat narrower band is dressed at right angles upon the left side as at *b*, so that the wheel will grind surfaces parallel to the axis of the work or shoulders at a right angle to it with equal facility. The work is now placed on centers with the large end toward the headstock. Positioning surface *B*, Fig. 16, before the wheel by means of the table traverse, the wheel is brought straight forward to grind it. As soon as contact is established, the slow-feed wheel (*A*, Fig. 3, Article I) may be engaged and the feed continued until the surface *B*, Fig. 16, is clean and true. The wheel is allowed to remain in contact with the work until the cut dies out, the operator meanwhile noting the reading of the micrometer dial on the cross-feed screw. It is well to have a pad and pencil handy on which to jot down successive readings and to make necessary calculations as the work progresses, lest the operator's capacity for mental arithmetic be overtaxed before the job has been finished.

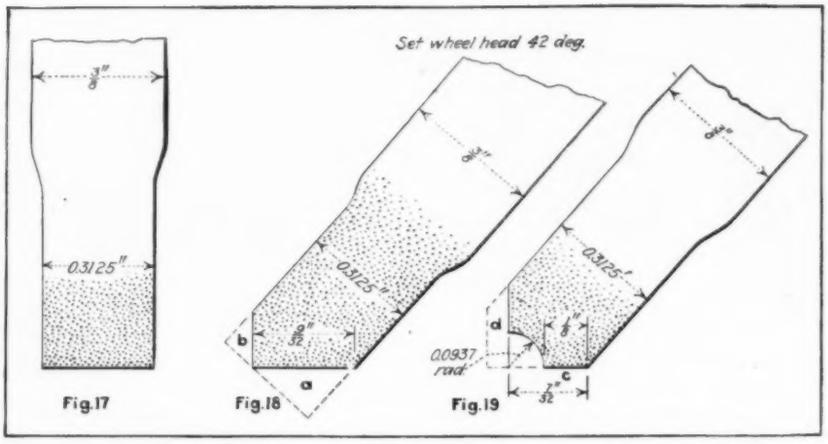



*Fig. 17—With the wheelhead set at zero the wheel is dressed on both sides. Fig. 18—The wheelhead is set at a convenient angle and the grinding surfaces are dressed parallel and perpendicular to the line of traverse. Fig. 19—The same wheel is filleted at the apex to grind rounded surfaces*

Running the wheel back and stopping the work, the operator now applies a hand micrometer over diameter *B* and notes the amount of stock still to be removed to bring it to drawing dimension. Returning the wheel to the work, the first reading of the dial is over-run by the number of divisions (less one, for the finishing cut) denoting the amount of oversize as shown by the hand micrometer. This cut is also allowed to die out while the second reading is noted and jotted down on the pad.

The second reading becomes the point of departure from which all the remaining diameters are calculated and sized successively by the aid of the micrometer dial. It is not absolutely necessary to apply the hand micrometer again unless, or until, the wheelhead is reset or the wheel dressed, as the wear of the wheel is so slight that it is negligible on the first cut.

As a matter of precaution, however, the operator checks each diameter with the hand micrometer, as it is ground. If undue wheel wear *should* occur, the check would show it at once, and to compensate therefor, the operator would over-run the mark on the dial by the amount indicated. The micrometer check is also a safeguard against possible miscalculation in subtracting the figures representing the various sizes.

In rapid succession diameters *T*, *J*, *M* and *D* are ground; not necessarily in this order, but in any sequence that may be convenient. Grinding diameter *J* will result in a narrow, flat band at the top of the round, which will serve as a guide in the subsequent operation of grinding the radius at this point.

At the same setting that diameter *D* is ground, the shoulder *C* should be faced with the side of the wheel by running the wheel-slide in and out while feeding the wheel to the cut with the traverse handwheel. This is the reason for deferring the operation upon diameter *D* until the last. The amount of material removed from shoulder *C* should be about one-half of the grinding allowance over the width *A*-*C*, and is measured with the hand micrometer.

After the final run-out of the wheel, and without moving the table, the zero line of the vernier on the long scale is adjusted to coincide with some major division of the scale. The end of the tool at *Z* may now be ground by traversing the table a little more than the distance *C*-*Z* to the left, bringing the wheel in to grinding position, and working back to the calculated measurement as shown by the scale and vernier.

Because of its nearness to shoulder *S*, the shoulder *N* cannot be reached with this wheel, hence it is necessary to pass it by until a more favorable opportunity is presented. But for the prohibitory circumstance, it would have been ground at this time and located from shoulder *C* in the manner above described.

The work is now reversed on centers and the end of the tool at *A* is faced as far as the mandrel will permit, using the same wheel and setting as before and gaging the distance *A*-*C* from time to time with a hand micrometer. Having reduced this width to the limit allowed for finish grinding, the vernier is reset as before and shoulder *S* is faced to distance *A*-*S*, taking care not to get below the computed diameter where radius *P* blends into it.

The work is now taken out and laid aside. The stationary diamond is secured to the table and enough material is dressed from the two grinding surfaces *a* and *b*, Fig. 18, of the wheel to make sure that they are true. The radius truing fixture is then put on and the wheel is dressed to the shape shown in Fig. 19. The fixture must be set very carefully with reference to the surfaces *c* and *d* of the wheel so that the extended lines of both will cut the center of radius accurately.

How the diamond is set to the desired radius with precision by means of a gage block is shown in Fig. 13 (third article), and how the center of radius is located with reference to the wheel by "touching" the diamond first to one surface and then the other of the revolving wheel, noting the readings of the vernier scale and

micrometer dial, respectively, and moving the table and wheel slide according to the calculated distances, is described in the text accompanying that illustration.

Returning the work to the centers, and with the wheel and work running, the periphery of the wheel at *c* is touched to any convenient diameter of the work to establish a new point of departure. The reading of the micrometer dial is jotted down for reference. The other grinding surface of the wheel—which may be called the side—is then touched to shoulder *C*, Fig. 16, and the vernier of the long scale is adjusted to a convenient base line.

Calculating from these two points, it is a simple matter to determine the position the wheel must occupy in relation to the work in order to grind one-half of the radius *J* to size and location. Reading from the scale, the table is moved over distance *C-J*, and reading from the micrometer dial, the wheel is brought forward a distance equal to the difference between diameters *K* and *B* (or *K* and *M* if that diameter was chosen for the point of departure) grinding one-half of radius *J* and at the same time grinding diameter *K* to size during the last few thousandths of advance. As the peripheral surface *c*, Fig. 19, of the wheel is purposely narrower than the width *K*, Fig. 16, the intersection *K-L* will not be ground at this time.

Reversing the work on centers, the opposite side of radius *J* is located and ground in the same manner. The same micrometer dial reading serves to indicate the limit of inward feed, but a new basis must be established for the longitudinal setting by touching the wheel to shoulder *S* and resetting the vernier.

At this stage the wheel must be changed. Note that so far but one wheel has been used, that but little dressing has been done upon it, and that the original setting of the wheelhead has not been disturbed. The next step is to grind shoulder *N*, for which purpose the wheelhead is set to an angle of not more than 5 deg., still on the same side of zero, and a thinner disk wheel or a saucer wheel is substituted for the first one. This wheel should be harder and of finer grain; about 80 or 100-L will do nicely.

This wheel should be dressed on the periphery and left side as previously described, and should be cut away on the right side to clear the corner *S-T* if necessary. To locate the shoulder longitudinally, touch the wheel to shoulder *C*, set the vernier, and traverse the table to the proper position as read from the scale, traversing a little beyond the position and working back to the mark, with the wheel grinding.

A word of caution may be justified here. A modern abrasive wheel 7 in. or less in diameter is a strong tool when presented radially, and will stand up to its work unless forced beyond reason. The same wheel presented with its plane of rotation at right angles to the line of pressure is quite another proposition and must be treated with consideration—the thinner the wheel the greater is the consideration demanded. To grind the shoulder *N* will therefore require considerably more time than was expended upon the others.

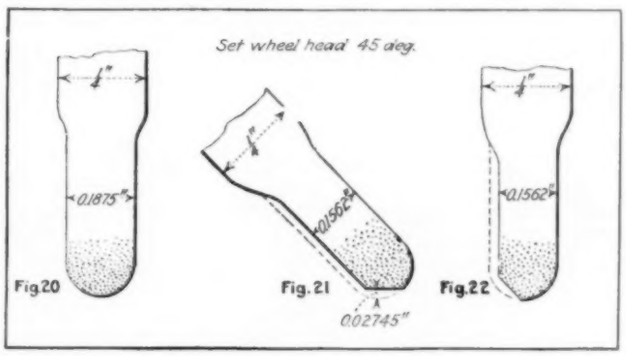



*Fig. 20—Periphery of wheel rounded with diamond in radius fixture. Fig. 21—Wheelhead turned to 45 degrees. Length of straight line calculated mathematically. Fig. 22—Wheelhead returned to zero to apply wheel to work*

To grind diameter *H* the wheelhead is set to zero, thus bringing the wheel spindle parallel with the line of traverse. A 60-L wheel $\frac{1}{4}$ in. thick is mounted on the left end of the spindle and dressed as in Fig. 20, the thickness being made 0.1875 in. as measured with the hand micrometer on the stationary wheel, and rounded on the periphery to the $\frac{3}{32}$ in. radius. Note the text accompanying Fig. 12 (article III) in regard to setting the center of radius central, widthwise of the wheel. The other wheel should, of course, be taken off of the opposite end of the spindle so that it will not interfere with the tailstock.

## Further Details

With the work on centers as in Fig. 16 (both wheel and work running) touch the periphery of the wheel to diameter *B* and note the reading of the micrometer dial. Then touch the left side of the wheel to shoulder *C* and set the vernier of the longitudinal scale. Traverse the table to the left until the center of radius of the wheel is exactly over the middle of the groove *H* and feed straight in to the required depth. The traverse movement in this case is 0.250 in. and the cross movement is 0.34375 in., corresponding to 0.6875, or six turns and $87\frac{1}{2}$ divisions of the dial.

The same wheel can be used with very little dressing to grind the surfaces *O* and *P* together by a straight-in cut. First, face $\frac{1}{32}$ in. from the left side of the wheel; then turn the wheelhead to 45 deg. as in Fig. 21 and dress the straight line corresponding to surface *O*, Fig. 16, by traversing the diamond before the wheel. To make this line to accurate length, touch the wheel to the diamond, note the reading of the dial, and then bring it further forward (while traversing the diamond) a distance equal to the versed sine of the angle to the given radius, remembering that the micrometer dial actually reads twice the distance traveled by the wheelslide.

Considering this as an example, the angle being 45 deg. and the radius $\frac{3}{32}$ in., we find from the table of sines that every toolmaker should have in his kit, that the cosine of 45 deg. at a radius of 1 in. is 0.70711, which, subtracted from 1 leaves 0.29289 = the versed sine. Multiplying this by 0.09375 (the radius $\frac{3}{32}$ in. expressed decimally) produces 0.02745 as the distance to bring in the wheel after the contact has been made. The "overlap" will read twice this amount, or 0.0549, on the micrometer dial.

Returning the wheelhead to zero as in Fig. 22, the wheel is positioned opposite *O-P*, Fig. 16, by means of the vernier scale, and is fed in to the work according to the dial, both points of departure having been established for the previous operation and noted on the pad. It would be well to undercut the right side of the wheel slightly in order to avoid scoring the already faced shoulder *S* as the wheel is fed in. This may be done after the angular dressing by setting the wheelhead slightly below the zero—not more than one or two degrees—and dressing the side with a diamond in the stationary holder, taking care not to reduce the width at the periphery.

# THE · FOREMAN'S · ROUND · TABLE

*The following narrative is a "case" presentation of the topic. It has been written to involve some of the questions that arise in the average shop. For guidance in preparing discussion the questions at the foot of the page have been prepared*

## *Do Brains or Beef Count Most?*

"I'M SORT of wondering, Ed, whether brains or beef count most in this foreman game."

"What's wrong now, Al—has Williams been jacking you up—or what has happened?"

"No, I'm thinking about what the Gem Company did to my old friend, Sam Buckley."

"I heard he got fired. Someone said he was sick, and had to be out too much. Was that the reason?"

"That's it, Ed, and it's a tough break, too. Sam used to be a husky bird—and he wore himself out getting the old Gem Company back on its feet. Worked all kinds of hours, and didn't take any vacations. Now they fire him—cold."

"Well, Al, the work has to go on, you know."

"It did go on. Sam always had an understudy and when he had to be out a day or two the work went on just the same. But the new manager had the idea that things were going to the dogs unless Sam was on the job every minute. He preaches that every man ought to have an understudy, but he doesn't seem to think you ought to use them after you train them."

"So I suppose Sam gets canned and the understudy gets the job. Makes you sort of wonder whether it's wise to train an understudy, doesn't it?"

"Of course it all depends on what kind of a man you're working for, Ed. I'm pretty sure that we'd have to be away a lot more than Sam was before Williams would think it necessary to let us out. He'd appreciate what we had done, and he'd know that three weeks of brains a month means more than merely being on the job every day."

"Does seem kind of hard on Sam, I'll admit, Al, but it's his hard luck getting sick."

"In a way perhaps. But when you think that he'd probably be O.K. if he hadn't overworked in pulling the Gem company out of a hole, it isn't much inducement to men to do more than they have to, so as to hold the job. The new manager preaches loyalty, but he doesn't seem to know what the word means."

"But you can't keep a sick man on the payroll indefinitely, Al. He ought to be on the job."

"Of course not. But if he's on the job enough to give a fair return for his salary, it's a cold blooded proposition to fire him after he's done a good job for you over a long period."

"But how would the understudy ever get a chance if you hang on to the old foreman that way?"

*Ed thinks the foreman who can't be on the job all the time isn't of much use. Al feels that if the understudy is any good he can "carry on" during his absence. How healthy must a foreman be to hold his job?*

All foremen are urged to discuss these questions vital to their work; of course the

discussion is not limited to foremen. Letters accepted and published will be paid for

# *Discussion of Earlier Topics*

### Helping the Firm Make Sales

I THINK that Ed's friend who made a sale while out on an erecting job certainly deserves commendation and bears watching for future promotion, as he certainly must be alert and aggressive. As to paying him a commission, I don't think that is any more proper than paying a salesman an engineering fee for an improvement idea he presents as a result of his selling contacts. And then, paying the erector a commission on a sale may unconsciously cause him to neglect his duties as an erector in favor of trying to sell.

The reward for any man who does something for the benefit of the organization beyond his regular line of duty lies in the favorable impression he creates and the foundation he builds for future promotions.

To directly and immediately reward him for this may so confuse him that from a good man in his own field he will deteriorate into a mediocre jack-of-all-trades. To occasionally make a brilliant gesture in another field of endeavor is far easier than to do it day in and day out. If, however, he shows a persistent bent for a field outside his present employment, it may be well to offer him permanent employment in this other field.

—Leon J. Lichtenstein.

PRESENT day business demands sales, and no matter what source the sale comes from, it is an asset to the concern.

Furthermore the man making this sale, which was not in his regular line of duty, should be watched for signs of salesmanship. If he shows ability for this line of work, no matter how good a mechanic he is, he should be given a chance on the sales force.

Sales are as vital to a business house as the president of the concern, and a mechanic that has natural sales tendencies should be developed. —V. O'Conner.

### Should He Report Another's Error?

IF THE shop in question had a proper checking system in its tool room it would have been very difficult for the presumably inexperienced operator to have disposed of the air motor so easily. It is customary on our railroad to repair all air tools and hydraulic jacks under the direction of one foreman. Several men specialize on this particular work, and we find it is much better than the old method in vogue some few years ago when each foreman had one of his men tinker with such things. Under the present method the work is done quicker, better, and cheaper, and a repair card covers each tool so that a straggler would be caught. It would appear as if the shop management that has a system whereby an air motor could get into the scrap without an order retiring it from service is not up to date.

The foreman in question could have asked several of his brother foremen if by any chance the motor had come from his gang. He would no doubt have found out where it came from. The foreman from whose gang it came would most likely appreciate the tip. I do not think it is necessary to tell the M.M. in such a case. The average railroad M.M. is "loaded to the gunwales" with worry and work, and is kept busy scratching to get out his month's quota of work. —P. W. Lamb.

THE foreman who found the good air motor should get in touch with the foreman from whose shop this motor came. He should give him an opportunity to get it back, and state that he would use it himself if not wanted, and that it would probably show up in the inventory. He can at the same time put in a plea for mercy for the offender.

In all dealings with fellow workers it is best to give the apparent offender a chance to straighten out any mess that might occur before going higher up.

—J. C. P. Bode.

### Promoting Interest Among the Boys

MOST boys like to know why things operate in a certain manner, and what are the best methods to use in doing a job. If proper explanations are given them by the foreman, they are likely to realize the importance of accurate work, while at the same time gaining quickly in knowledge of their trade. Having established a good contact and respect, the foreman can easily get more thoughtful attention to safety. If a boy is approached along these lines, it will tend to show him that he has a real job.

Occasionally after a boy starts an apprenticeship it is evident that he is not destined to become a good machinist. In such a case, the foreman should advise him to try something else. However, the boy should not be discharged until he has been given a fair chance of at

## THE · NEXT · TOPIC

**Helping the Efficiency Engineer**

ADVANCE QUESTION

*The Old Man intends to get an efficiency engineer to look the shop over. Al thinks it's up to the foremen to give him all the help they can. Ed thinks he ought to know it all himself.*

least several months' time during which he has become accustomed to his position. —F. E. CLARKE.

### Putting Color on the Machinery

THE trend away from dark colors in the shop is a step in the right direction. One result of the use of light colors is the quick disclosure of dirt so that its removal is assured. A shop that sticks to the old order of things stands out in direct and unfavorable contrast to the more progressive establishments.

Perhaps the Galanta shop has carried the idea a little too far, for obviously such a variety of colors would be expensive. However, the use of red for the guards may be regarded as good practice, for this color is universally accepted as a danger signal. It operates to discourage workmen from coming in contact with protective devices.
—J. H. CHEESMAN.

BRIGHTER colors than those ordinarily used in shops tend to make working therein more pleasant and cause better illumination through greater reflection of light. These combined results cause the operator to take more interest in keeping his machine clean and in better running order, and these conditions are much more easily seen. If the operator develops pride in his machine, he will also develop pride in his work.

I believe that machine manufacturers should adopt a light gray as a standard color. This will save the considerable expense incurred in meeting the demand for a wide range of colors, and will also avoid delays.
—R. Q. TARBUTTON.

IN ONE plant, which is making a four-cylinder motor, all of the machinery and the lower portions of the walls and columns are painted medium dark green enamel, while the upper part of the wall is painted with white enamel. Ninety per cent of these machines have individual drives, so that the factory is free from belts. This point, coupled with the color of the machinery which is restful to the eye, attracts much attention and is remarked upon by all who visit the plant.
—H. C. JOHNSON, *Germany.*

### Monthly Checks on Workmen's Ability

IN A case of my own observation, when a foreman was to be chosen in a certain large shop, the man who was best qualified for the job was overlooked because he happened to be in disfavor at that time on account of some scrap work. If any record of his ability has been on hand for comparison, he would have been selected, for he was really the better man as was proven some time later. Also, much undesirable material can be eliminated by this process, and the more valuable men easily discerned. —FRANK H. WALGENBACH, *Foreman.*

A MONTHLY check will not prove as practical as a check made semi-annually. The clerical work is increased six-fold over the semi-annual method.

The check made every six months possesses another advantage in that it can be combined with semi-annual or annual considerations for wage increases of the employees. Thus a double use can be made of the check as it enables the foreman to pick the right man for any position that is open, and at the same time it provides a basis for wage increases. The workmen, under a plan of this kind, will be more likely to put forth their best efforts. They know that periodically they will be recommended for increases if they justify them, and that if they show qualities of leadership and organization they may be considered for higher positions. A shop using a plan of this kind is not likely to have good men leaving its employ because they did not receive an increase without asking for one. —JOHN KOLLARIK.

### He Never Asks for a Raise

BILL Hankins was right in that an employer is obliged to know a man's worth. Although a workman will not usually openly make comparisons between his work and that of another, yet it is true that he will be discontented if his better workmanship is not recognized through a higher wage. Rather than lose his self-respect, the workman will look for other employment.
—F. BERMANN, *Production Engineer, Austria.*

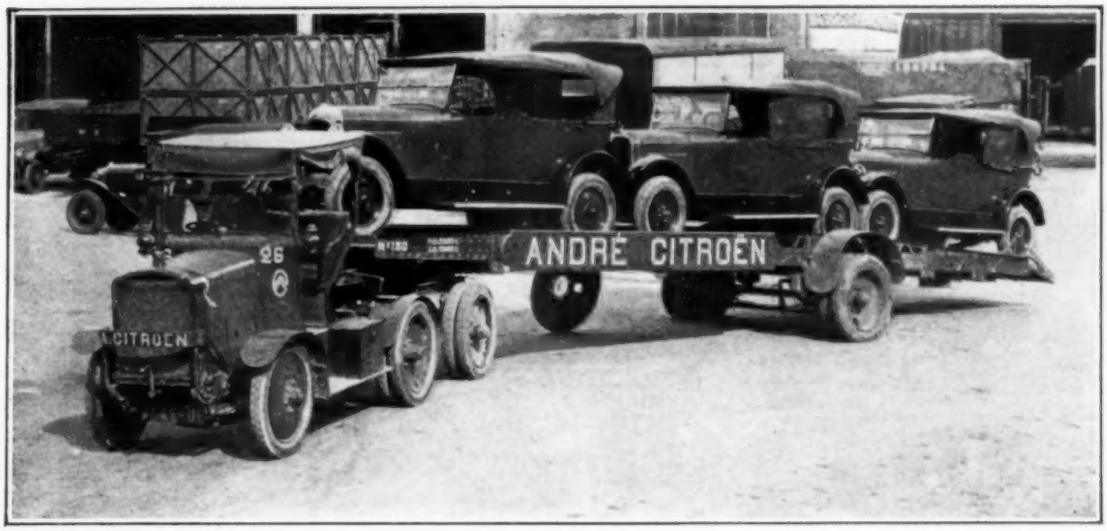
ENLIGHTENED employers today are paying their workmen what they are worth rather than holding back raises until demanded. This policy gives a really worth-while workman an incentive to increase his production and skill. On the other hand, it shows to those that are undeserving the necessity for self-improvement. Such a policy in time brings about a better working force, as those who have the proper characteristics are satisfied, while the undesirables who are not reconciled to the necessity for better work eventually leave.
—W. R. NEEDHAM, *England.*

### Something Besides the Pay Envelope

PLEASE do not be offended if I ask you a question, Mr. Miller and Mr. Tarbutton. Has your natural inclination been to look for a job where you thought you would be interested in your work, expecting to make a living wage, or did you look through the various vocations to see which paid the most money, and then qualify for that job? I'll wager that the interesting work was of prime importance.

How often do we hear or put the question, "Does he take an interest in his work?" The very happiness and welfare of the workman depends largely upon the interest he has in his work. A man's value to his employer, the quality and quantity of his production, his dependability and loyalty, and the possibilities for promotion are all largely dependent upon this interest.

We can certainly afford to put in quite a bit of time and effort to interest the men in their work. Here is one way. On a two- or three-shift production job, keep a daily record of the production for each of the three shifts, marked plainly on a board so that all may read. Better yet, is a tabulation of the individual man's production. This visible record system gives the workman a personal interest in his own production, and in the production of his shift, and is used extensively by the Ford Motor Company. It is really surprising to hear how glibly, and how interestedly, many of the men tell how the unit cost of a certain part has been reduced from $11\frac{1}{2}$ to 6 cents in less than three weeks. It's the game of competition that interests them.—B. T. HAWLEY, *Foreman.*




# Moving Materials

## *Between Widely Separated Plants*

By J. A. Lucas

HANDLING material satisfactorily in one plant is quite a proposition. Multiply this by seven, with some of the plants as far as 6 miles apart, and you have the problem of Andre Citroen, the largest builder of automobiles in Europe. For the work on the Citroen car comes from seven different plants, all on or near the banks of the Seine, but scattered in the various suburbs as shown on the map, Fig. 1. For convenience the plants are arbitrarily numbered for easy reference. Plant No. 1, at Clichy, which is the largest, covers an area of more than 1½ million sq.ft. and includes the foundry and forge shop in addition to machine shops for making dies and for machine maintenance. Not far away is St. Ouen, No. 2 plant, where the sheet-metal stampings are made. In plant No. 3 at Levallois, equipped with 2,300 machine tools, the electrical equipment such as generator and starting motors are made. Woodwork is done in plant No. 4, while the motor is machined and assembled at Gutenberg, plant No. 5, and rear axle housings, stamped at St. Ouen, are taken to Grenelle, plant No. 6, to be machined. Plant No. 7, at Javel, is where the final assembling is done.

With the necessity for handling so much material in mind, it is easier to appreciate the task of building up a capacity for producing 1,000 complete cars per day, as Mr. Citroen has done. At the close of the World War, with plants that had produced over 50,000 shells per day, he was confronted with the problem of utilizing these plants toward the industrial rehabilitation of France. Setting his first goal at 100 cars a day, he started with a 40-car production in June 1919 and has gradually increased it. The machine equipment is largely American and the

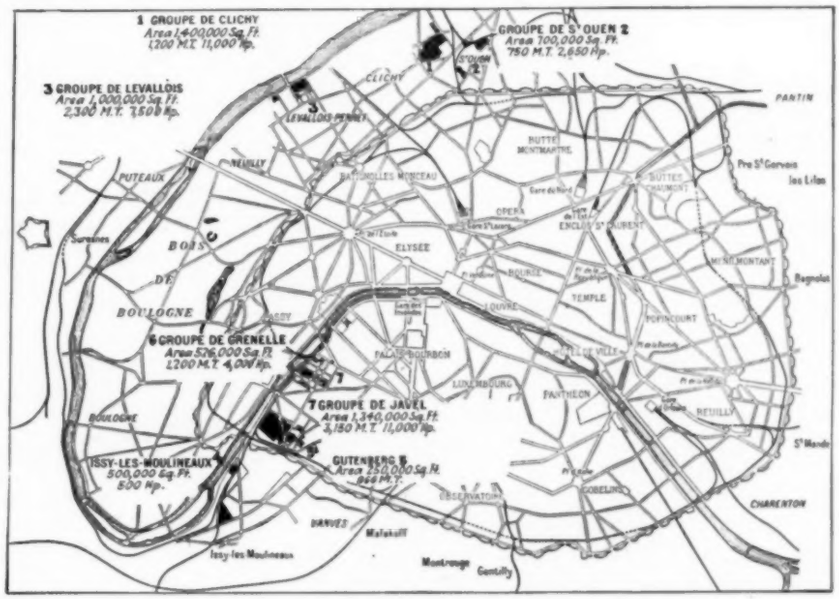



*Fig. 1—Map showing the location of the seven plants operated by Andre Citroen in Paris. They are all on, or near, the river Seine which winds through the city. Four of them are outside the old walled city. The greatest distance between any two plants is 6 miles*

*Fig. 2—Airplane view of plants at Clichy and St. Ouen, Nos. 1 and 2 on the map in Fig. 1. These plants are quite near each other and are connected by rail. This view shows the type of buildings used, which includes both saw tooth and monitor roofs*

*Fig. 3—Steel trucks, or wheeled bins, that are used to store and handle small castings and similar parts. They are made in standard sizes and can be stored in a minimum of space, yet are easily moved*

*Fig. 5—Another type of wheeled truck for carrying small stampings. Steel boxes as shown in the foreground are used and there are also trucks with high corner posts as shown directly behind the first truck*

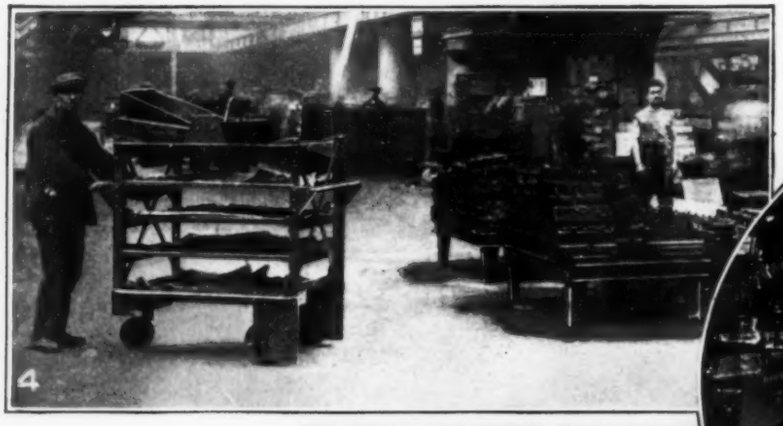


*Fig. 4—Other racks and trucks. The racks or platforms can be handled by lift trucks, while the racks have shelves and are on three wheels. It will be noted that the larger wheels are guarded by the plates that form the legs at that end*

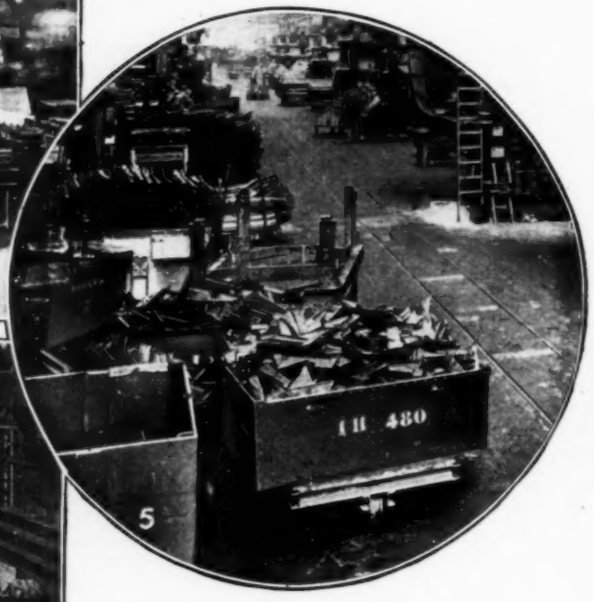


*Fig. 6—Belt conveyors for carrying stampings from the presses to the inclined conveyor at the end of the two belts in the foreground. They clear the work away from the machines and carry it to another department without further handling*

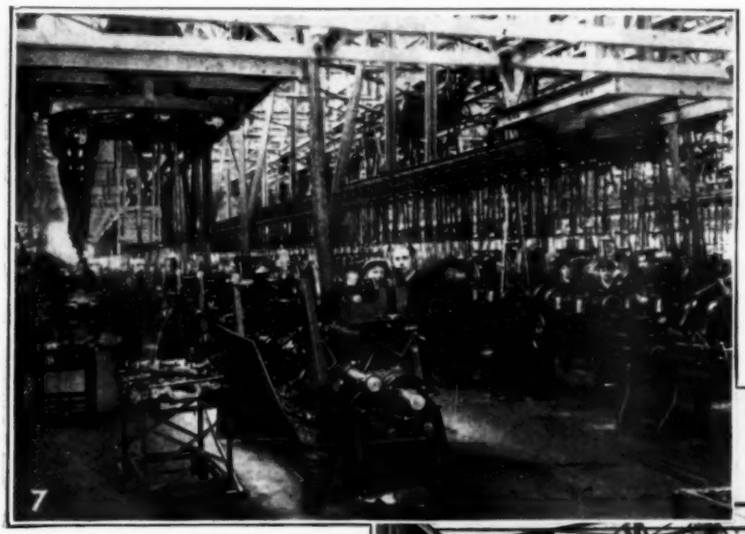


*Fig. 7 — Overhead chain conveyors for handling crankshafts. The line at the right shows the shafts in place while the one at the left shows the hooks into which the flanges of the shafts fit, suspended from the chain*

*Fig. 8—Towing motors and trailers for frames and similar materials. It also shows two types of jib cranes, the one at the right having a short jib that can lift the load to its own platform*

*Fig. 9 — Trailers that have brought complete front and rear axle units to the assembling plants. The stacks at the right show the method of storing so as to be readily accessible and yet free from danger of damage. Small, wheeled trucks are also shown in front of the stacks*

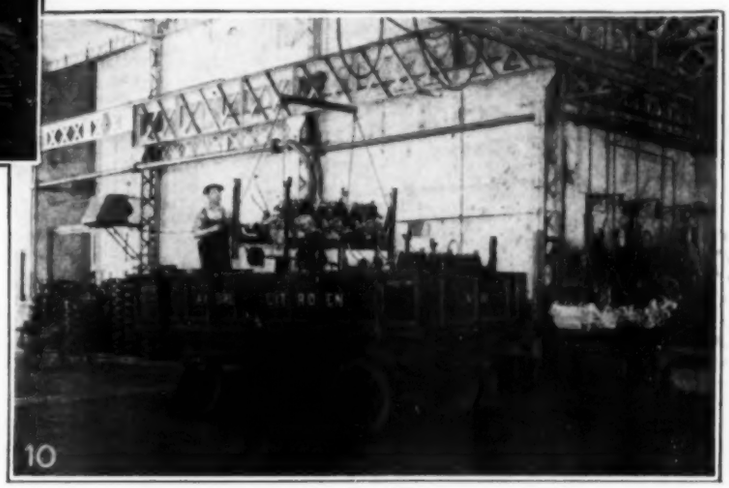


*Fig. 10 — How complete motors are handled both individually and on small trucks from the trailer at the left. These small trucks hold three motors each and have small uprights that prevent movement. They are hoisted by the sling shown*

*Fig. 11—Towing a large trailer with a small Citroen car equipped with belt, or creeper traction. At the left is another creeper equipped with a high bumper for pushing as well as towing cars*

conveyor idea was adopted to aid in production. Two of the plants, Clichy and St. Ouen, as seen from the air, are shown in Fig. 2. As will be seen they are connected by rail, both directly and by the Y at the right. Mr. Citroen now employs about 45,000 people, 30 per cent being women. He also builds steel car bodies, using the Budd methods, and has assembling plants in England, Italy, Belgium and Germany.

Beginning with methods of handling parts in the plants we find the steel bins with wheels in Fig. 3 and the stands and skeleton trucks in Fig. 4. The construction guarding the wheels is rather unusual. Another type of material-handling truck is shown in Fig. 5, and is used for comparatively small metal stampings. Belt conveyors are used to carry other stampings from the presses to other departments. As shown in Fig. 6 there are two long, horizontal belts that feed the material to an inclined belt at the end.

Crankshafts are handled on an overhead chain conveyor as in Fig. 7. Here the large ends of the shafts are attached to suitable hooks that hang from the chain conveyor to hold them at a convenient height for the men. The empty carriers can be seen at the left while the line at the right is filled with shafts, although the maze of belts makes it difficult to see the details clearly. The length of the conveyor lines gives some idea of the number of crankshafts that are in production at once.

Lift trucks and trucks both for towing and trucks equipped with jib cranes play their part as in Fig. 8.

*Fig. 12—Another type of tractor and showing some of the cases used in handling material. These are structural steel frames with wooden linings. The frames fit on each other by means of suitable corners*

For handling sub-assemblies from one plant to another there are several kinds of trailers, as shown in Figs. 9 to 11, arranged to be towed by various means. Fig. 10 shows how completed engine units are handled both in and out of the trailer. In Fig. 11 are shown two of the Citroen cars with creeper attachments, This is a type of drive that is used in the French desert colonies in North Africa. One of them is towing a large trailer and the other a box car. The creepers have high bumpers at the rear for pushing cars when in reverse. A different tractor is used in Fig. 12, which also shows a type of steel-framed cases used in handling some kinds of work. The headpiece of this article shows the trailers used for delivering finished cars from the assembling plant to the salesrooms.

## Standardization in the French Automobile Industry

By F. M. Mansfield
*Paris, France*

THE Bureau of Normalization in France is not a government institution, yet even the Journal Official recognizes its work in shipyards and government arsenals in an official manner, and also the Department of Posts and Telegraphs and the Aviation Service are more or less dependent upon the bureau in their specifications. The bureau finds government support for its arguments, although it does not actually get financial subsidies.

The automobile accessories industry has already made much progress in securing the adoption of standards by the industry, and many varieties of small parts have already been "normalized." Notably gas and water tank

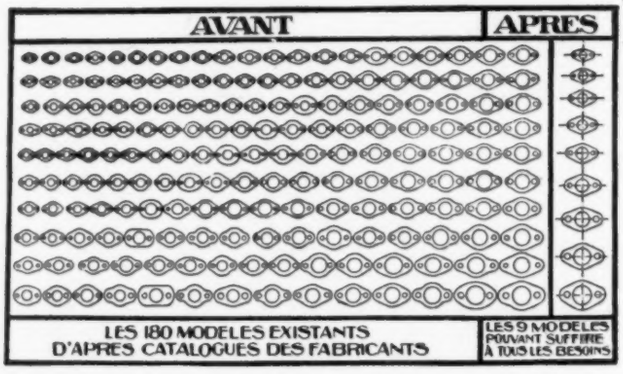



*Chart showing number of French gasket sizes before and after standardization*

caps have been reduced in number, and those now actually in use have been reduced by 80 per cent of their former numbers. The same standardization is carried out with bolts, nuts, tie rods, etc., as far as threads and diameters are concerned. The accompanying illustration shows graphically the progress that has been made in reducing the number of sizes of pipe joints and gaskets.

It is admitted, however, that up to the present in all mechanical lines, France is far and away behind America, Germany and England, where the character of the organizations which have brought standardization to where it is has a certain official recognition.

# Flexibility Efficiency Expansibility —*Determine Truck Plant Layout*

By K. H. CONDIT
*Editor, American Machinist*

TEN carefully considered layouts were made, studied and discarded before those responsible for the new General Motors Truck Company plant were satisfied that they had one that would meet the possibilities of the future as well as the requirements of the present. The eleventh plan is unique, I believe, in at least one particular—adequate provision has been made for receiving goods shipped by motor truck.

It is my observation that, even in the modern manufacturing plants, the architects and plant engineers have failed completely to recognize the important place in the transportation picture now occupied by the motor truck. If the plant is designed with this factor in mind motor truck deliveries can be directed so that little or no additional handling of materials is required. With rail freight, on the contrary, the receiver is at the mercy of the railroad's spotting crew.

In the case of the General Motors Truck Corporation there were two important reasons why motor truck deliveries demanded particular attention: The weight and bulk of the units coming in; and the fact that a large part of the supply comes from plants within a radius of 30 miles. The Pontiac engines used in the small trucks come from a factory in the same city, and the two sizes of Buick engines used in the somewhat larger ones come from Flint, which is only 30 miles away. In this plant the motor truck has an even break with the railroad. On the east side of the main building there is a dock 1,500 ft. long for the sole use of arriving loaded motor trucks. At one end of it is a short space for incoming electric railroad freight. As will be seen from the plant layout, Fig. 1, there is also ample railroad trackage. Now, as to the other features of the plant. In deciding on what type of structure to erect, three main factors were given consideration, and in this order: (1) flexibility; (2) efficiency; and (3) expansibility. Flexibility was considered of first importance for two reasons; first, because of the great variety of vehicles manufactured by the General Motors Truck Corporation. It will be understood that trucks, taxicabs, and motor coaches are manufactured in this plant. The trucks vary from small delivery wagons through a very complete range of capacities to five- and seven-ton heavy-duty vehicles.

Numerous special features and optional specifications are characteristic of the taxicab business. Motor coaches are built in several chassis models and in a large range of bodies. Some idea of the variation in the body types is gathered as one sees parlor cars ranging in seating capacity from 17 to 33 passengers, city-service single-deck bodies suitable for seating from 21 to 33 passengers and great double-deck city service bodies for seating as many as 67 passengers.

In the second place, flexibility was necessary because of the possibility of future changes in design of all types of commercial vehicles.

The need for efficiency goes without saying. In discussing the various plans proposed, the company officials split into two groups, one upholding the single-story plan, the other standing out for more than one story

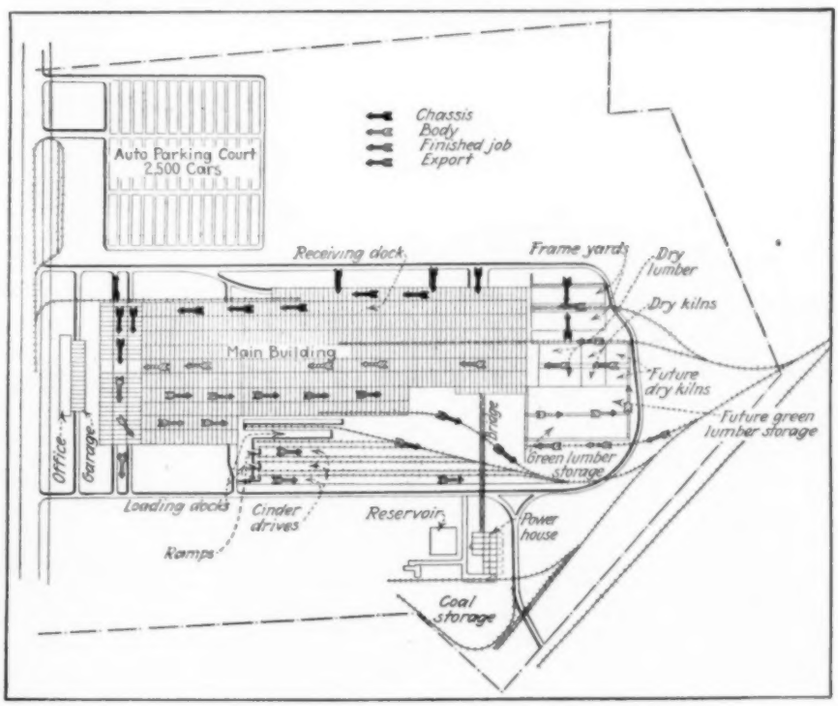



*Fig. 1—General plan of the new General Motors Truck plant at Pontiac. Ample provision has been made for expansion as the need arises. Either side wall can be moved outward with little difficulty*

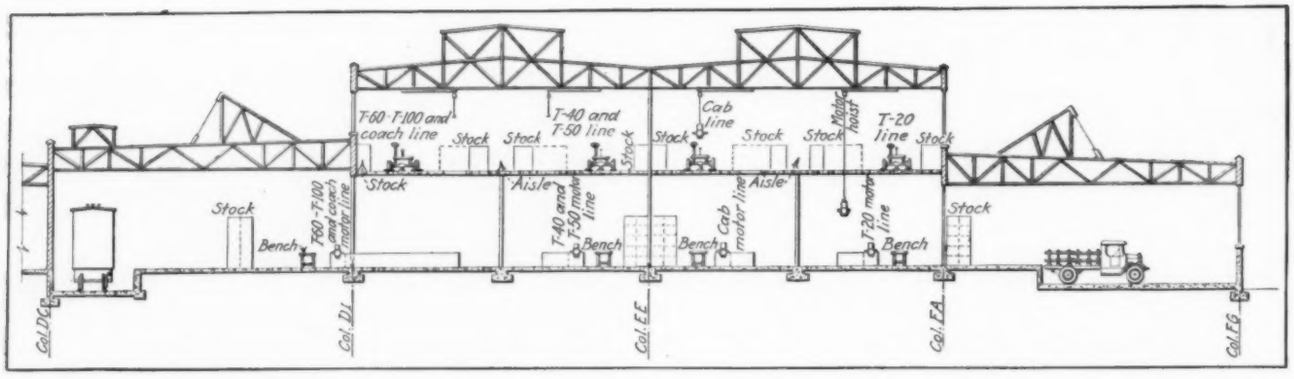



*Fig. 2—Cross-section through the assembly building. Parts assembly is carried on on the lower level, the finished parts being lifted by motor hoists to the main assembly lines on the floor above. The motor truck receiving dock is at the right. Parts are delivered here as near as possible to the place where they will be used*

over at least a part of the plant. Eventually, two factors threw the decision to the latter group. One was the difficulty of distributing parts and supplies along the conveyor lines when more than two lines are used, as was the case here. The other was the discovery that something like one-third less earth had to be removed as a result of placing frame storage, green lumber storage, dry kilns and dry lumber storage upon an upper level.

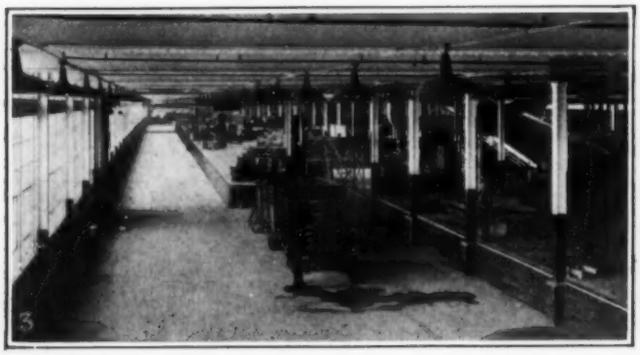
Analysis of the transportation of parts vertically showed that the actual lifting was but a small part of the task. Consequently, it made little difference in the cost of the operation whether a part was lifted 6 ft. or 26. With provisions for four chassis assembly lines, for the many types of buses, trucks and taxicabs involved in this manufacturing problem, it was finally decided that sub-assembly lines should be provided for on the main floor, with hoists and elevating conveyors to take the completed units up to the proper main line on the second floor. Fig. 2 is a diagrammatic portrayal of the plan as it was worked out.

Parts and materials are received from motor trucks or freight cars at the point nearest to the place where they are to be used, or at the point from which they start along a conveyor line. One end of the motor truck receiving dock is shown in Fig. 3. This dock, remember, is 1,500 ft. long. The corresponding freight car dock on the opposite side of the plant is shown in Fig. 4. The tires are mounted as part of the sub-assembly on the floor below, and are moved by conveyor to the chassis assembly lines, two of which can be seen in Fig. 5. In Fig. 6 is shown a part of the conveyor that is used to carry the wheels up to the assembly line.

After they have been tested on some one of the twenty dynamometers, Fig. 7, the completed chassis are driven down the ramps to the lower floor, Fig. 8, where they start along the chassis painting line. After a yard test the finished chassis start along the final assembly line where the bodies, which have come along an assembly line of their own, are attached, as are fenders, lamps and other accessories. The finished body jobs are given the final touches in a spray booth similar to that shown in Fig. 10 before they reach the final assembly line. Elaborate arrangements have been made to protect the powerful electric lights used so that there can be no chance of a fire started by a broken bulb or wire. Some of the finished jobs are driven away, others are shipped by box car, and still others are knocked down, Fig. 11, and carefully crated for foreign shipment.

Almost nothing has been said here of the extensive facilities for handling and treating the great quantities of lumber used in manufacturing bodies. That is outside the field of an article confined to the metal-working industries but it is none the less interesting and complicated.

Green lumber storage is arranged for outside the rear wall of the plant adjacent to the frame storage area, see Fig. 1. Just as the frames enter the east side of the rear end of the building on one leg of a U, so the body lumber enters the west side through the dry kilns on the other leg of the U. Chassis assembly and body manufacture then progress along the two legs of the U parallel to each other until they reach the front of the building, or the bottom of the U. The chassis then start across at right angles picking up the bodies as they go, and the completed jobs are passed out to the various ship-



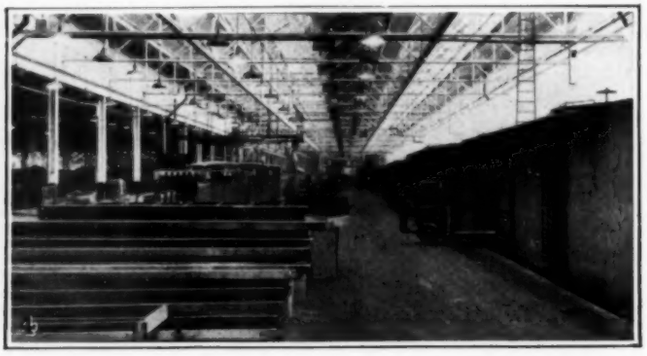


*Fig. 3—Where goods are delivered by motor truck. This dock is 1,500 ft. long and is adjacent to the stock room and parts assembly. Fig. 4—Freight car dock on opposite side of plant from motor truck dock. It will be evident that ample provision for good lighting has been made. Besides helping to speed the work, accidents are fewer*

*Fig. 5 — Motor coach chassis assembly line. A truck line is visible at the left and two of the motor hoists near the center*

*Fig. 6—Chain conveyors for bringing up wheels and motor hoists for lifting other parts from parts assembly floor to main assembly lines*

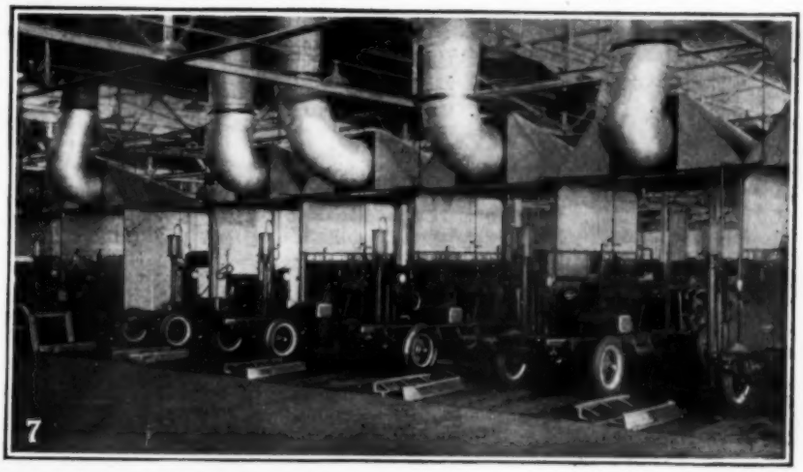


*Fig. 7 — Some of the twenty testing dynamometers on which every chassis is given a run-in*

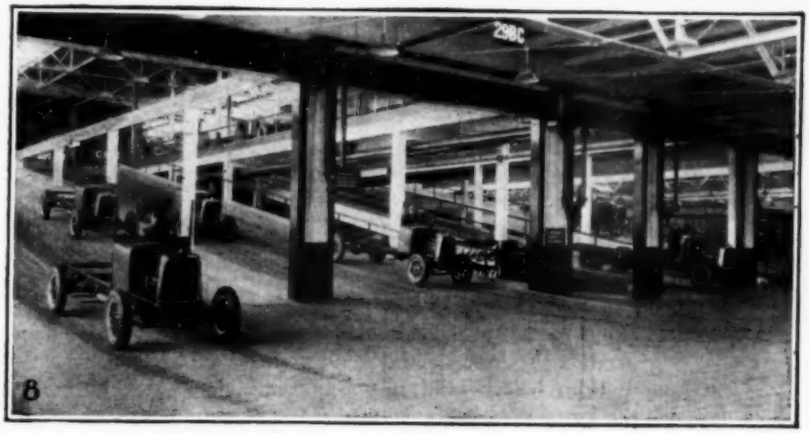


*Fig. 8 — Finished chassis coming down the ramps from the testing dynamometers to be painted and have the bodies mounted*

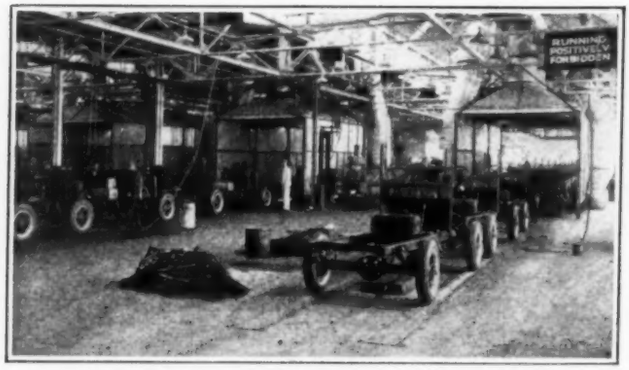


*Fig. 9 — Chassis starting along the chassis painting line where last touches are put on preparatory to mounting the bodies*

*Fig. 10—Two of the body painting spray booths. Special lighting fixtures are used to avoid all possibility of fire from an electric spark*

ping docks. The arrows on Fig. 1 show the direction of flow of the various parts and the completed jobs.

And what of the provisions for expansion, the third factor considered in selecting the plan? Experience with automotive plants in early days, when almost as much time had to be spent in enlarging facilities as was put in on production, and in the days just after the war when expansion was vital to existence, made those in charge of planning this plant insistent that it should be flexible to the maximum extent. Consequently, sprinkler mains and other piping are carried some distance away from building walls. Longer feeders had to be laid for the present plant, but when expansion takes place it will not be necessary to dig up tons of concrete. Steam, water and electric mains and storm and sanitary sewers all are of ample capacity to care for greatly increased floor area.

For the same reason, the walls of the sides toward which expansion will take place are mostly glass and steel framing. There are no brick pilasters. The solid wall runs up only a few feet and it will be a simple matter to move the glass out as far as may be necessary and knock over the lower brick wall.

Expansibility has been placed last of the three critical factors, but it is not a certainty that it is the least in importance. The field for motor coaches, taxicabs and trucks is developing so rapidly that plant expansion is indicated as a near-future necessity.

*Fig. 11—Packing for foreign shipment is coming to be an important part of the work. Adequate facilities are provided for doing a thorough job*

# Substitution of Steel Castings for Cast Iron in Machine Tool Construction—*Discussion*

By G. B. Stuart

I AGREE with A. F. Davis in his statement on page 936, Vol. 68, of the *American Machinist*, to the effect that rolled steel shapes can be effectively built up into machine parts to replace gray-iron castings. But I believe that Mr. Davis, like Mr. Hart in the previous article, does not go far enough in this matter. The manufacturers of welding equipment are working hard to try to convince machine builders of the value of welded parts, particularly welded machine bases. But, they are also defeating their own ends by talking price, and turning out examples of welded work that are eyesores, and will not be accepted readily by the machine tool builders to replace the better appearing castings. No one wants to have a machine in his shop that looks as if the base were a haphazard, patched-up job.

There is no doubt that much money can be saved by building up parts from standard structural shapes welded together. But why not save just a little less, and make a better appearing job by covering up some of the ugliness with plates, or otherwise? I have heard this matter discussed in many shops, and the discussion always ends the same way—"Yes, welding is strong and cheap, but it looks like the devil."

What the manufacturers of welding equipment have done lately is to scare the foundrymen into producing better castings than they have ever produced before. Until recently, semi-steel was a very questionable material, but lately I have seen machine castings made of semi-steel that were exceedingly fine, and were guaranteed to be of uniform quality. Also the "high-test" cast irons that have lately been out on the market are claimed to be almost equal to malleable iron, and yet to cost very little more than ordinary gray cast iron. What the manufacturers of welding equipment must do now is to persuade the machine builder, and to show him by example, that machine bases and other parts can be made equal or better in graceful lines than the foundry can produce. Strength and good appearance are, in my estimation, better talking points than cheapness, although the latter is important.

# Putting the *Finishing Touches* on Machine Parts

By Ellsworth Sheldon

AIR-DRYING pyroxylin lacquers are being applied to a considerable extent as protective coverings for otherwise unfinished machine parts. They are easy to apply, dry quickly, and present a smooth, hard and glossy finish. Several of the prominent builders of machinery have experimented with, and some have adopted, these mediums; among the latter being the Bullard Machine Tool Company, to which the writer is indebted for data and photographs.

The first covering applied to the major parts of Mult-au-Matics and vertical turret lathes is an oil-base paint. It is blown on the sand-blasted castings with an air gun before any machining has been done upon them. It is allowed to dry for 24 hr., after which a coat of filler—also an oil-paint—is spread over it by the same means.

Conclusion of the article.

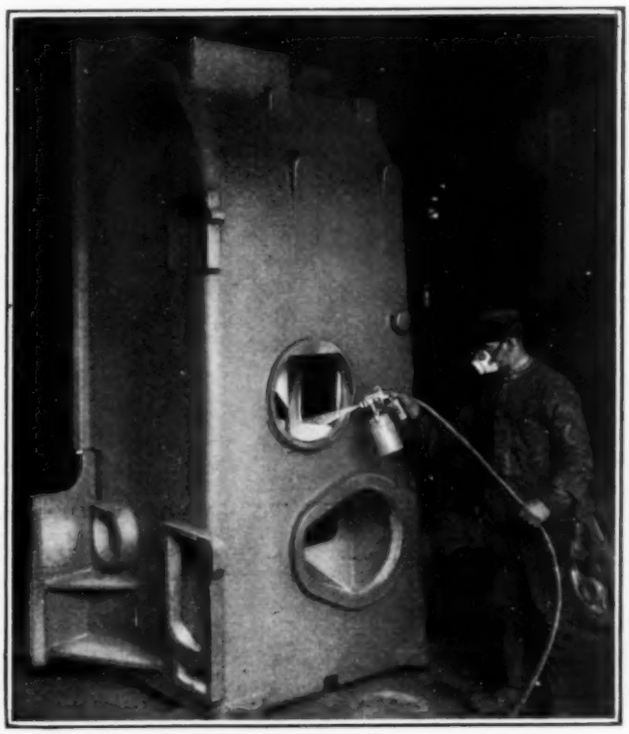


*Fig. 9—Pockets in many of the castings serve as reservoirs for lubricating oil in the finished machines, hence they are coated with an oil-proof white paint to seal the pores of the iron. The paint is put on with an air gun*

*Fig. 8—Large, flat and unobstructed areas are rubbed down by means of a portable, power-driven sanding disk*

While the filler is still plastic it is gone over by hand with a piece of chamois leather saturated in benzene. The soft, sticky material will flow sluggishly under pressure of the fingers of the operator, who is thus enabled to fill out and smooth over any rough places. This operation takes the place of filling, before painting, with an iron-paste filler and does away with the use of a putty knife with which the filler was formerly applied.

When the filler coat has set firmly it is rubbed down with sandpaper, applied by hand to corners, moldings, etc., where necessary, and by means of the power-driven sanding disk to be seen in Fig. 8, to wider surfaces. The sanded surface is well adapted to receive the later coats of lacquer, but is somewhat porous and is therefore covered with a "sealer," or surfacing paint, to preserve it from the action of oils and cutting compound with which the casting will be splashed while undergoing the machining operations.

This sealer is the first of the pyroxylin lacquers. It is applied with the same air-spraying apparatus and in the same manner as the oil paints. The interior pockets of many of the castings are used as reservoirs for lubricating oil in the finished machine, and to keep the oil clean and free from particles of sand that might work into bearings, the pockets are treated with a special oil-proof paint, ivory white in color, to seal the pores of the iron. Fig. 9 shows how the work is done from the outside by the air gun, which enables the operator easily to reach places that would be difficult of access with a brush.

The application of the sealer coat to the outer surface and the oil-proof paint to the pockets, completes the preliminary stages, which up to this point have been conducted in the cleaning room adjoining the foundry, and the castings are now sent to the shops to be machined and assembled.

Photographs and data relative to cadmium plating and sherardizing are by courtesy of the New Haven Sherardizing Company, Hartford, Conn.

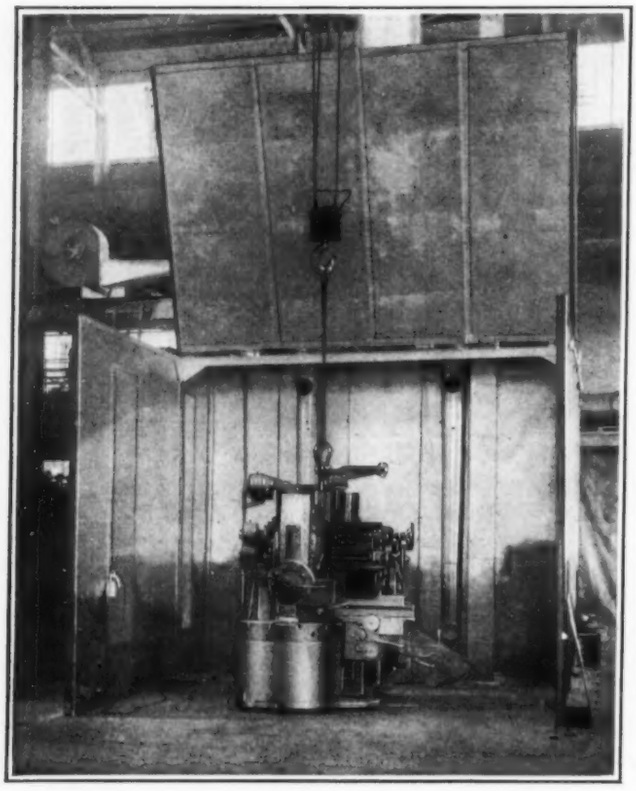


*Fig. 10—Two coats of lacquer, one with a gray pigment and the other transparent, are put on after the machine has been finished. The top of the spray booth is made as a hinged lid to allow the machines to be set in and removed by the crane*

To receive the finishing touches, the machine is set into the inclosure shown in Fig. 10, which is provided with an exhaust fan and suitable pipes to convey the fumes of the lacquer to the outside air. The top of the inclosure is a hinged lid that is raised to allow the crane to deposit a machine within.

The surfaces to be lacquered are carefully cleaned from oil and grease by washing them with benzene. All polished parts are slushed to prevent the lacquer from adhering to them. Two coats of lacquer are applied, the first carrying the gray colored pigment characteristic of these machines and constituting the finish coat so far as appearance is concerned. Reasonable care is taken to keep the spray from the slushed parts, but if any is deposited thereon it does no harm other than to waste material, for it can be wiped off easily with the slush after the remaining surface has dried.

After the gray coat has hardened, which it does very quickly, all of the bright parts are wiped clean and a final coat of clear, colorless pyroxylin is sprayed all over the machine, including the bright parts. The latter are thus covered with a hard, glossy and perfectly transparent film that under ordinary shop conditions serves very effectively as a rust preventative.

Sand-blasting has long been employed as a means of cleaning the surfaces of castings preparatory to painting them, and to remove from articles of high-speed steel the scale that forms upon them during the hardening process. By a modification of this process, called "mud-blasting," a finished appearance is imparted to the unground portions of cutters, reamers, taps and similar tools made by the Pratt & Whitney Company. The mud-blasted surface is of a neutral gray color that contrasts pleasingly with the silvery sheen of the ground cutting edges. The process is, however, in no sense preservative; it merely leaves a good surface to which a transparent rust preventive is later applied.

A row of the mud-blasting machines may be seen in Fig. 11. The funnel-shaped bottom of each contains a mixture of sharp sand and water. The essential feature of the machine is a combined suction ejector and spray nozzle by which the fluid mixture of sand and water is drawn from the bottom and sprayed violently over the work. Air pressure at 90 lb. per sq.in. is employed.

Though the shower of sand and water exercises a sharp abrasive action upon metallic substances, it is not injurious—unless long continued—to the hand, hence no special precautions are necessary in handling work into and out of the machine. The action of the sand upon wood is very slow, advantage of which condition is taken by using wooden paddles with pockets or pegs for holding

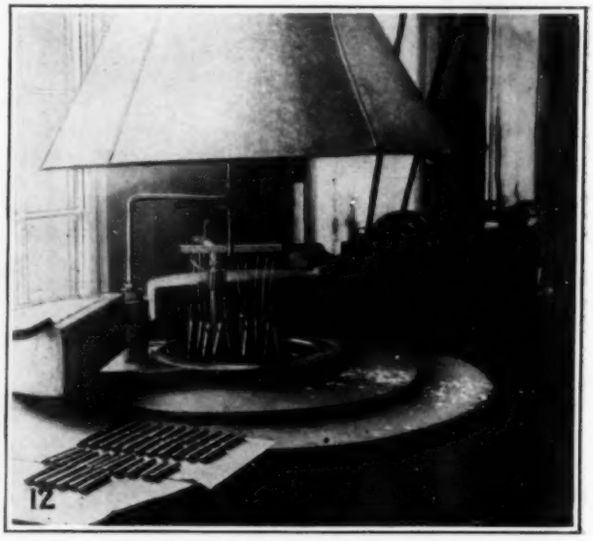


*Fig. 11—The active part of the mud-blasting machine consists of a combined suction ejector and spray nozzle. Sharp sand, suspended in water, is contained in the cone-shaped bottom of the machine, to be blown over the work by compressed air at 80 lb. pressure. Fig. 12—Gage handles, tap wrenches, etc., are blued by heat. A salt bath is heated to about 750 deg. in an electric furnace and the articles to be blued are immersed in the molten salt*

the articles while subjecting them to the blast.

A method employed by the same company to finish the smoothly polished parts of tap wrenches, the shanks of knurling and threading tools, gage handles, etc., is that of bluing by the application of heat. An electric furnace to be seen in Fig. 12 heats a special salt bath to a temperature of about 750 or 800 deg. F., and the articles to be treated are suspended in the molten salt until they have acquired its temperature. The articles may be suspended from hooks, as shown in the illustration, or they may be set into racks, held by tongs, or in any way that is suited to their size and shape.

Electro-plating articles of iron and steel with rust-resisting metals has long been practiced, partly as a preservative process but principally to enhance the appearance of the article so treated. Apart from the precious metals, nickel has been the most widely used. Recently the metal cadmium has come into prominence for the purpose and has proved to be a better rust preventive than nickel, while possessing all the advantages of the latter metal as a decorative finish.

Cadmium is not a hard metal like the more expensive chromium—which is now extensively employed to reinforce the surfaces of drawing dies, bearings and other parts where resistance to wear is the prime requisite—but it is easier to apply, and it shares the non-corrosive and weather-resisting properties of chromium to a marked degree.

Various means are employed to effect the electro-deposition of cadmium, though the operation is in the

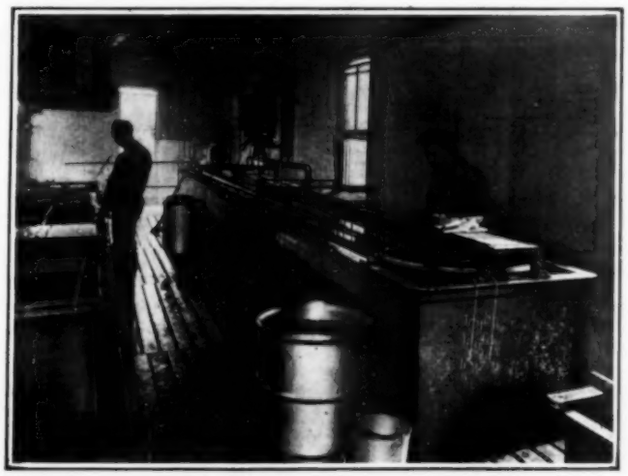


*Fig. 13—In the cadmium plating tank here shown there is a continuously running conveyor, driven by a small variable-speed motor. The operator hangs work to be plated on the conveyor, to his right, and it is carried around the tank. It is ready to be taken out upon completion of the circuit*

main very similar to nickel plating. Small articles that cannot readily be strung on wires are placed in a wooden tumbling barrel so mounted that it can be immersed in the plating solution. Short chains depending from the copper axle of the barrel convey the necessary electric current to the work as the barrel revolves.

Parts that can be wired or that can be suspended from hooks are plated in a long tank—shown in Fig. 13—that is fitted with an automatic timing and conveying device. Any part of the tank may be the loading station; the operator hanging unplated articles on the conveyor to his right and removing the plated parts as they return to his left hand after having made the circuit of the tank. The time of plating is varied by changing the speed of the small motor that drives the conveyor.

If the plated article is intended to present an attractive appearance it may be polished and buffed before plating. When cadmium is applied only as a rust preventive, no preparation is necessary other than to tumble the articles in an ordinary tumbling barrel and put them through a chemical cleaning process. It is of even greater importance than in nickeling that the articles be chemically clean.

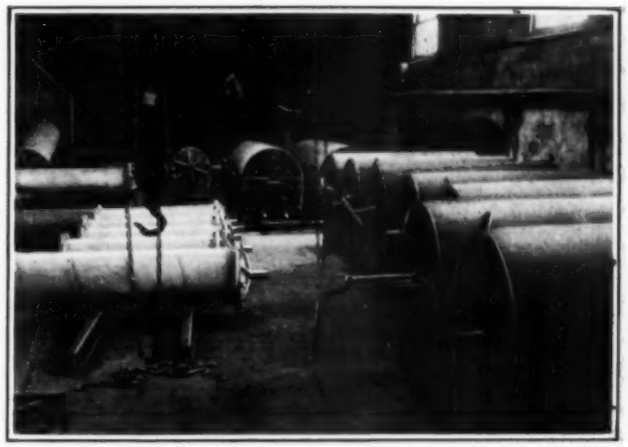


*Fig. 14—Articles to be sherardized are packed with zinc dust in metal barrels. After the barrels have been closed they are subjected to heat in the round-topped furnaces to be seen at the right and at the farther end of the room*

"Sherardizing" is the name given to a dry process of coating iron and steel articles with zinc. The articles to be treated are packed with granulated zinc dust in closed metal barrels, several of which may be seen on the floor in Fig. 14, and subjected to heat in the round-topped furnaces at the right and at the farther end of the room in the same illustration.

The articles and the zinc dust are charged at the same time, the barrel being stood up endwise on the floor for the purpose. The proportion of work to zinc dust varies somewhat with the size and shape of the articles to be sherardized, but there should always be plenty of dust to completely surround each individual article. The barrel is filled almost, but not quite, full, as it is a matter of importance that there should be sufficient space in the loaded barrel to allow the work and dust to change position constantly as the barrel is revolved.

The head is now secured and the barrel is placed horizontally in the furnace, where it rests in trunnion bearings. The rounded cover of the furnace is removable to allow the barrel to be placed by means of a crane. The furnace is fired by gas to a temperature of about 750 deg. F., and the duration of the heat is about five hours.

The barrels are turned by hand at intervals of fifteen or twenty minutes throughout the heat. The end of one trunnion is squared to receive a wrench. The barrel is turned one or more revolutions each time and is allowed to come to rest in a position different from that previously occupied.

The heat is just under the melting point of zinc, hence the physical character of the metal is not changed in the operation. After removing a barrel from its furnace it is allowed to stand until cold, when its contents are dumped into a revolving screen which separates the dust from the articles. The dust can be used repeatedly by adding a sufficient quantity of new material to make up for that absorbed by the articles.

# Odd Jobs

## From a Southern Railway Shop

### Miscellaneous machining methods and time-saving devices that help to turn out repairs on a schedule basis—Grinding, milling and turning set-ups

BY THE addition of modern equipment to handle locomotive repairs, in the form of labor-saving devices and machinery, the Nashville shops of the Nashville, Chattanooga & St. Louis Railway Company has been enabled to turn out repairs on a scheduled basis. Most of the machine work is done in two buildings separated by a transfer table. One building is arranged to handle repairs to wheels, axles, and driving boxes, and the other, being the main shop, houses equipment to take care of the majority of repairs. Locomotives entering the shop are placed over a stripping pit, equipped with a locomotive hoist. After being stripped they are transferred to one of the ten transverse pits in the erecting department which forms part of the main shop. All stripped parts are cleaned in a lye vat before undergoing repairs. The main shop is subdivided into zones, each of which handles a stipulated class of work, such as connecting rods, and piston or crosshead repairs. The shop does not have a traveling crane, although it is equipped with traveling electric hoists at convenient points.

Piston rods requiring refinishing are ground in the cylindrical grinder illustrated in Fig. 1. The operation is handled without dismantling the piston from the rod, or in other words, as it is taken from the engine. The amount of material removed depends upon the condition of the rod, inasmuch as the practice followed is to merely clean up the worn surface. From 20 to 40 min. is required for the average run of work.

Pistons, likewise, are repaired while assembled to the rod, so that the ring grooves and outer surfaces, if they have been built up, can be machined concentric with the piston-rod. In Fig. 2 are shown a piston and piston rod

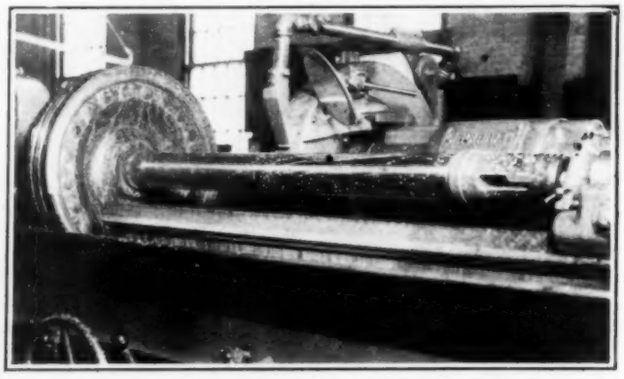
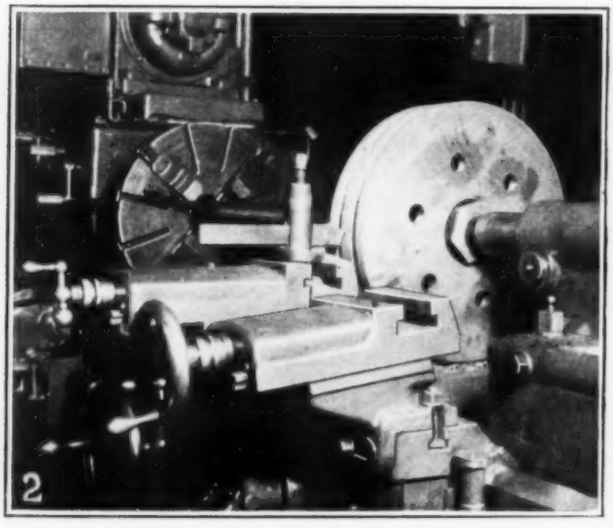


*Fig. 1 — Grinding the outside diameter of a piston rod assembled to a piston. In repairing such work, the practice is to remove just enough material to clean up the worn surface. Time is saved by not having to dismantle the assembly*

The first part of the article. The conclusion will appear in an early issue.



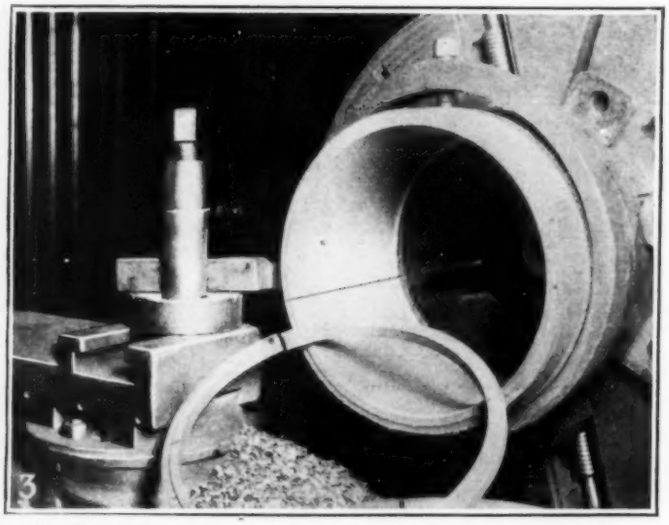
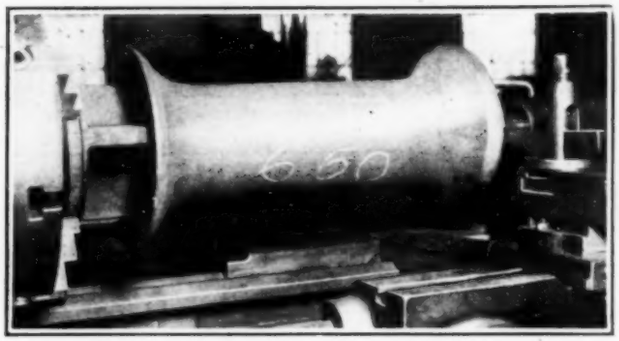


*Fig. 2 — Turning the outer diameter and refacing the ring grooves of a piston. The machine is equipped with two carriages to enable turning and facing to be done simultaneously. When handling new work, the piston rod can be rough turned and the piston can be finished at the same time. Fig. 3— Valve packing rings are split before being turned, so that they will be concentric when assembled. A forged ring equipped with a setscrew, enables the slit in the pot to be closed. The operation includes boring, turning, facing, and cutting off*



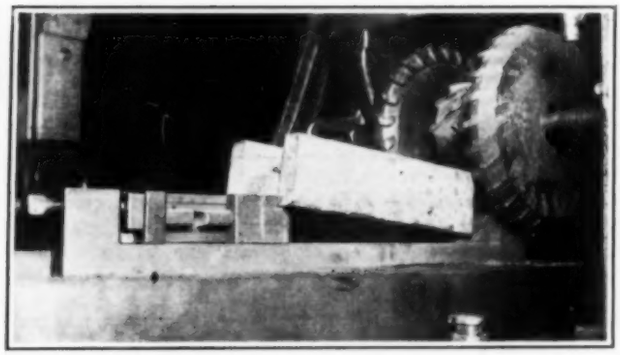


*Fig. 4—Turning both ends of a piston-valve spider at one setting. The work is held by bull centers, one of which is gripped in a chuck, the other being supported by the tail center which is fitted with a ball-type thrust bearing. Fig. 5—Milling the outside and facing and the frame fit of a wedge in one setting. The work is held in a fixture by a stationary jaw at one end and by a movable jaw at the other. The operation is completed in 8 minutes*

assembly mounted in a 27-in. lathe for machining. The machine is equipped with two carriages, so that turning and facing can be done at the same time. When a new piston and rod are being made, one carriage can be used to rough turn the rod, the other to machine the piston.

Valve packing rings are made by sawing the rough pot castings longitudinally through the wall with a $\frac{1}{8}$-in. saw, and then boring, turning, facing and cutting off the rings from the pot as illustrated in Fig. 3. The pot is clamped by a four-jaw chuck at one end. A forged ring equipped with a setscrew holds the casting together at the slit while a ring is being turned and cut off. Handling the operation this way, instead of each ring after turning, makes possible the machining of a concentric ring at one setting, and eliminates the second operation of finish turning. A completed ring, showing the sawed slot, is resting on the carriage.

Piston-valve spiders are machined on both ends at one setting in a 24-in. lathe as shown in Fig. 4. The work is held by bull centers that have serrated faces to grip and drive the casting from the bore. A chuck holds the bull center at the left, while the opposite one is supported by the tail stock, the center of which is equipped with a ball bearing to take the thrust required to hold the work. Handling the operation as shown has cut the machining time in half over the former method.

Shoes and wedges are machined in one cut, as shown in Fig. 5. Approximately $\frac{1}{8}$ in. of material is removed from all surfaces by two 14-in. side cutters and an 8-in. slab cutter, all of which are of the inserted-blade type. The work is held from both ends in a fixture having a sliding jaw at the left and a permanent locating block at the right. The wedge shown, made of cast bronze, is machined in 8 min., floor-to-floor time.

# Through the Stock Room Window

By G. S. Wayne

THE stores department of any manufacturing concern depends for its efficiency rating, to a great extent, upon the ability of its window man who issues supplies. Essential supplies may be bought at the best prices the markets afford, and yet if care is not continued after the materials reach the stockroom, little has been gained. It follows then, that while the window man may not and usually is not as highly paid as the storekeeper or the purchasing agent, he occupies a relatively important place in the stores department organization.

An efficient window man is accurate, yet quick; courteous, tactful, and ever zealous in guarding against any infringement of the rules governing the issuance of stock. The window man is likely to become a rather good student of human nature, coming in contact as he does with all the various types of people found in any large industrial plant. He gradually classes them into groups. One group consists of the loquacious ones who like to take up his time discussing the possibilities of the corn crop. A poker face and faraway look in the eyes will often discourage this particular pest.

Then there is the fellow who suffers from too high an estimation of his own importance. He never gets quite the right thing for his work. He must measure it, squint his eye along it, and in fact put it through a severe visual inspection before he can convince himself that the article is good enough for his needs. A poorly concealed smile at the wrong time in the proceedings will help greatly to expel some of the hot air from this fellow's system.

Next come the favor seekers, who want to take a tool away from the window without giving the check which they always forget to bring with them. Or they may want just a small quantity of this or that, too small an amount for them to take the trouble to obtain a requisition. Reasoning with them, or a positive "No" when that fails, are among the best methods of handling this group.

The window man is always too slow for the "hurry-up" group and their cousins, the slam-em-down boys, who enjoy slamming the tools they are returning on the window and having a noisy time generally. Ignore them, ridicule them or give them the slowest service possible and they may eventually become human. Next we have the foremen, sub-foremen and other big butter and egg men who like to be waited upon ahead of their turn—let them wait.

And the "bird" with the "line," who likes to tell you a new one on the Scotchman, and that other first rate entertainer, the foreigner, who tries to make you understand everything but what he actually says. The best way to treat them is to whistle and keep your mind on fishing or any other seasonable sport.

And last, there is the easy-to-wait-on fellow, who gets just what he wants, thanks you and clears out.

# IDEAS · FROM · PRACTICAL · MEN

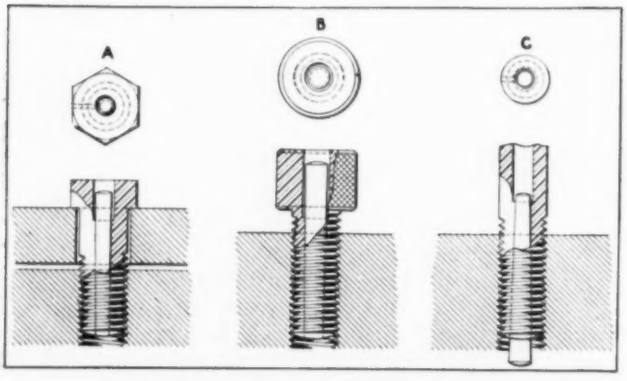
*The department, "Ideas from Practical Men," is devoted to the exchange of information on methods useful to the machinery industries. Its scope includes all divisions of the metal-working industry, from drafting room to shipping platform. Descriptions of methods or devices that have proved their value are carefully considered, and those published are paid for. The rates are from a minimum of five dollars upwards, depending upon their merit*

## Expansible Threads

By Henry Simon
*Jena, Germany*

In the illustration is shown a method of varying the diameter of threads that can be used to advantage in some instances, both for obtaining and maintaining a desired fit within extremely fine limits, and for providing a locking or holding action independent of the use of any extraneous member.

The idea is very simple, consisting, as will be seen, in locating a standard taper pin in the length of thread it is desired to vary. The thread is made to the minimum allowable dimension, and the diameter is varied by driving the pin in or out. Where the threaded part is subject to severe stress, as in the capscrew at *A*, a comparatively small pin should be used in order not to reduce the strength of the threaded stem. Where strength is a




*Threaded parts that can be expanded*

secondary matter, and an exact fit the prime consideration, there is no reason why a pin of relatively large size should not be used.

It is possible to expand a solid thread, such as shown at *B*, by a very small amount in this way, though it is necessary in that case for the threaded stem to be soft. It will be best to slot the threaded expansible portion as shown at *A* and *C* so that it will be possible to increase the diameter sensibly, though it should be remembered that the idea of the expanding construction is not that of changing a "sloppy" fit into a tight one. The maximum expansion is possible with part *C*, where the threaded portion is to be locked against play and turning, but where strength is of no great importance. Part *A* is designed for a lesser expansion and therefore a closer fit, but greater strength.

In all cases, relief for the taper pin should be made by a slightly larger countersunk hole carried to or beyond the expanding area, so that no unnecessary resistance to expansion is created, as would be the case if the taper hole extended without relief all the way through.

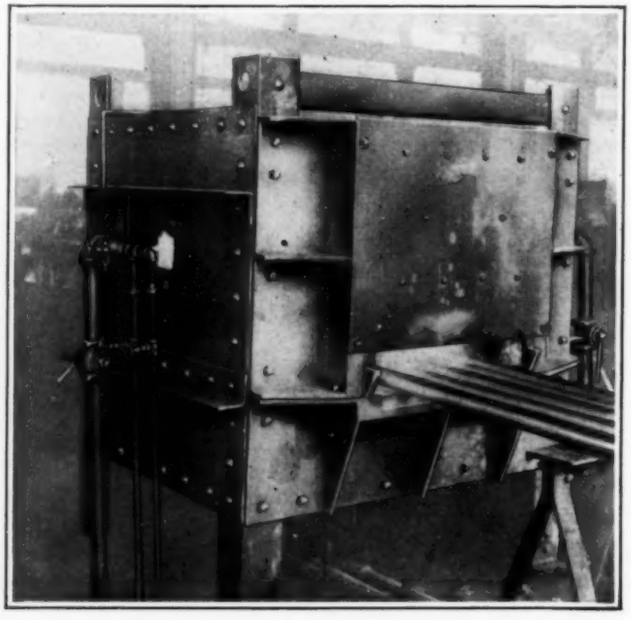
As a holding means, the expanding thread is likely to be valuable where it would be difficult or expensive to use any of the ordinary external clamping devices, such as a split construction of the nut or the threaded seat, a locknut or a pressure plug. As a means of maintaining a desired fit, it is especially valuable because of its extreme nicety of adjustment.

## Interchangeable Furnaces

By John C. Kielman

The linings of furnaces, especially those in which high heats are maintained, burn out quickly and need frequent renewal; an operation that under ordinary circumstances shuts down the job dependent upon the furnace and upsets production schedules generally. The forge plant of the New Departure Manufacturing Company at Bristol, Conn., is served by many furnaces that are required to be in practically continuous operation, and to avoid delay consequent upon burned-out linings the replacement scheme here described was adopted.

All of the newer furnaces are made with an outer shell of steel plates, having corner posts of heavy angle iron extending below the body to support them, and a few inches above the top to provide means for attaching them to the crane. The oil burners are not fastened to the shell in any way, but are supported by permanent



*Portable interchangeable furnaces*

pipes rising from the floor on each side. All the burners and the burner holes in the furnaces are the same height from the floor.

When a furnace needs to be relined it is picked up by the bridge crane at the close of any convenient working period and taken to a corner of the shop set aside for the purpose of furnace repair. The same crane deposits a newly lined furnace in its place between the burners within a very few minutes, and the job is ready to proceed as soon as the new furnace can be heated to working temperature.

The old furnace is repaired at the convenience of the workmen having that part of the job in hand, and is held subject to requisition from any part of the shop. By having several "spares" available at all times there is never any delay because of the failure of a furnace.

## A Jig for Locating Boring Bars

By Frank C. Hudson

A somewhat unusual form of jig or fixture was seen recently in the shop of the Pilliod Company, Swanton, Ohio. The work is on one of the arms used in connection with the Baker valve gear for locomotives, and the center distances of the various holes are maintained within fairly close limits. The arm is held in a substantial fixture which is provided with a cover or locating plate that differs from the usual fixture, in that it does not guide the boring bars, but only locates them.

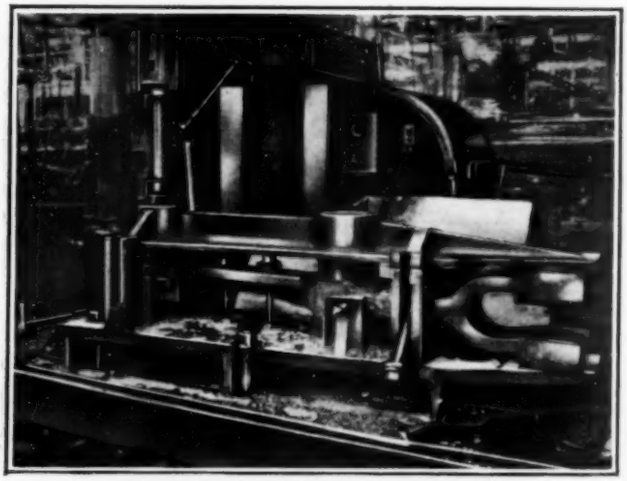


*Fig. 1—Locating work under spindle*

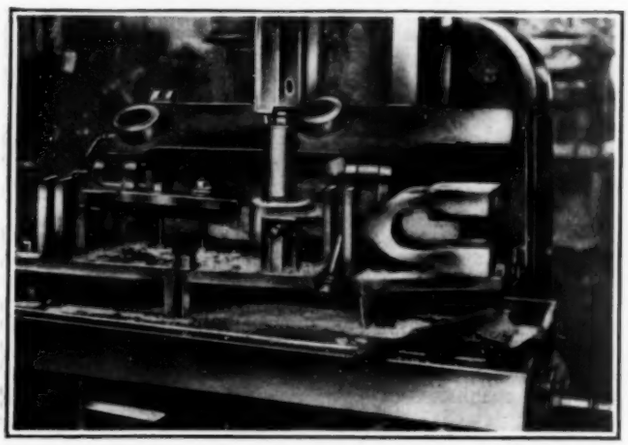


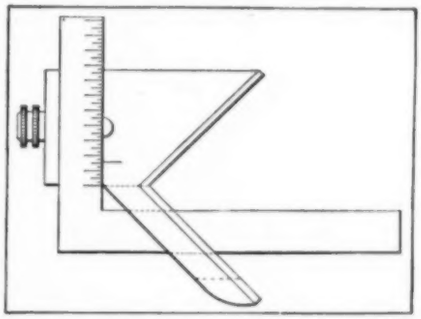
*Fig. 2—Cover plate thrown back for boring*

This feature is shown in Fig. 1 where the upper plate is down over the work and the work has just been located under the spindle for boring the hole at the left. A locating plug is put in the spindle and the work is moved until the plug enters the hole in the fixture, easily. Then the plug is removed, the locating plate is lifted as in Fig. 2, and the hole is bored or reamed as desired. The illustrations show one hole being located and the other hole being bored. This method was considered as being more satisfactory when fixture cost is considered, than using hardened steel bushings of various sizes.

## A Center Head for Offset Work

By Charles E. Ard

In the illustration is shown a center head that was made for scribing lines offset from the center across the ends of round stock. It is particularly useful for laying out lines for the offset centers on eccentric shafts.



*An adjustable tool for offset-center lines*

The tool consists of a center head, a small flat square and a clamp screw and nut for holding the square in place. The head has an extension on one side for a bearing for the short limb of the square, the end of the extension having a ledge against which the square abuts. The opposite leg of the head is slotted to allow the long limb of the square to pass through, the slot being wide enough to permit the limb of the square to be adjusted laterally therein.

In use, the square is set by the graduations to the required offset distance from the center and the tool is used in the same way as the standard center square.

## Making Erasures on Tracings
### *Discussion*

By Harry Hoisington

In an article under the title given above, on page 228, Vol. 68, of the *American Machinist*,[1] Harry C. Kline advocates a not uncommon rule, that no steel blade be allowed in the drafting room to be used in making erasures on tracings. This rule seems to be open to further discussion. The successful erasure on tracing cloth depends largely on the man who put on the ink, and whether or not he bore down hard on the ruling pen, but even so a trained man with a keen blade that actually does not seem to touch the cloth at all, will lift the mass of ink so neatly that very little rubbing with a rubber free from abrasive will accomplish the neatest possible job and, moreover, he will do it in a fraction of the time consumed by any other method. Why hamper and discourage a diligent man who knows how, by a blanket rule because the apprentice does not know how? Is it not better to show the weak man how to do it, incidentally making clear to him the right way of laying on ink?—One does not quit eating in order to certainly avoid dyspepsia.

# TECHNICAL · ABSTRACTS

### Building Far Eastern Trade

The purchasing power of the Orient has increased so rapidly that our gains in commerce have been only to a very moderate degree at the expense of our competitors, but the time is coming when we will have a real struggle on our hands if the present rate of progress is to continue. There are four points on which Americans should concentrate in building greater trade volume with the Far East, as follows:

1. The greatest need of our Far Eastern traffic is more attention to the selection of agents. In no part of the world is this problem more serious, partly because of the prior arrival of our European competitors, who have long been developing adequate agency arrangements. This factor of agency arrangements is the outstanding defect in our trade campaign in the East, and it behooves each manufacturer or merchant interested in this territory to give special attention to that phase of his efforts.

2. Because of the dependence of the buying power in these sections upon a few great staple raw materials, it is highly important that the early prospective exporter proposing to operate in that area watch the trend of prices of these commodities. This might seem to be an obvious truism, but it is so frequently overlooked by otherwise watchful merchants that a repetition is desirable.

3. By all means every possible effort should be made to sell the Far Eastern markets distinctly American merchandise and ideas. There are still evidences of the lingering fiction that we must be careful to meet every native whim or desire and in no way to attempt to introduce outstanding American commodities or trade practices. Nothing could be more seriously misleading and unprofitable, especially in the East where there is now such a widespread awakening of new industries and new buying power. It is distinctly the ideas and commodities of the New World which are wanted to satisfy this new trade.

4. Last, and in many ways most important, must be the determination of our merchants to carry through a long-time effort in developing these markets. The age-long traditional prejudices of the East are still strong and make necessary a prolonged campaign in many cases. These markets, above all others, are not to be won in a day or even a season. They require careful study and most patient, intensive effort.—JULIUS KLEIN, *Magazine of Business*, May.

---

### Waste Materials Disposal

The function of the du Pont Salvage and Reclamation Division is to provide a central control for handling waste materials. It assists the industrial department on problems connected with the salvaging, reclaiming, preparing, classifying, storing, and shipping of waste materials resulting from, or incident to, any of the manufacturing operations. The following items illustrate the wide variety of materials covered: bags, drosses, residues, barrels, kegs, boxes, platinum, non-ferrous metals, scrap iron and steel, lead, burlap, lumber, rag, rope, string twine, furniture and fixtures, scrap paper, scrap rubber, niter cake, bristles, silver, papers, cores and plugs, general stores and supplies, oils, wood, machinery, buildings, autos, and iron drums.

At the plants where accumulations warrant, the waste materials are sorted to conform to the major classifications of the National Association of Waste Material Dealers. Plant managers maintain close contact with the Salvage and Reclamation Division and advise what materials and quantities are available, so that it is often possible to negotiate sales at better prices than would otherwise be obtained.

Iron barrel hoops represent one problem which this division has solved. Such hoops in their natural, tangled state are extremely difficult for handling, loading, transporting, and unloading. They are now reduced to uniform bundles for feeding into open hearth furnaces and are disposed of at a profit.

Such economies as these are reflected ultimately in lower consumer prices for du Pont products. Aside from that, du Pont experience shows that salvage and reclamation activities promote more careful handling of raw materials and finished products on the part of plant operatives. They promote good housekeeping and thereby have an important bearing on safety and efficency.—*The du Pont Magazine*, June.

---

### Unemployment

There are five main varieties of unemployed, the full-time leisure class, the part-time leisure class, those in transition from one job to another, those who are incapacitated, and those forced into prolonged idleness because of low business activity.

Our leisure class is growing. A smaller proportion of our population is regularly working than fifteen years ago. The part-time leisure class has increased also. One straw pointing in this direction is the growth in high school and college enrollment.

A readjustment of occupations has been going on rapidly of recent years, due to the extension of engineering efficiency and the development of new industries. During the last ten years tens of thousands of workers have been released for other employment. Fortunately, other industries such as automobile accessories and garages, radio, airplanes, new roads, and building have been expanding and draining the labor market. No comprehensive data are available on employment in these lines. I wish to commend the plan put into effect by the clothing industries; namely, the payment of a substantial sum to the worker who is being displaced by machinery. This recognizes the principle that the worker's years of training and experience give him an equity in the industry. The payment helps to carry him over the readjustment interval and lightens the shock upon the whole economic organism.

A suggestion has been made that we even up our employment in bad years by appropriations for public work. I believe in this idea but realize its limitations. When a public project has been approved and the money made available, the pressure for completing the project will not permit much waiting for depression.

During the last nineteen years average unemployment, taken as the difference between full and actual employment, was 874,100. This is 2 per cent of the total employed, and is not high. I venture to predict that the showing for the next decade will be as favorable.—H. W. Morehouse, *The Management Review*, June.

---

### The Economic Aspects of Standardization

From the practical point of view, there is but one criterion by which to judge a piece of industrial standardization, and that is its economic justification.

One of the factors involved in determining the economic value of a standard is its timeliness. The modern automobile is one of our best instances of standardization. And yet, any effort to standardize twenty-five years ago would have resulted either in failure or in a retarding of development quite as bad. The automobile was then in its early development stages, and it is useless to try to standardize in the midst of unusual developments. There is also the style factor. If people will not buy standardized goods, the attempt is a failure. It is not justified economically.

International standardization meets with the greatest obstacles due to difference in measuring units and difference in the state of the manufacturing art from one country to another. This particularly affects size standardization. As we pass down the line to standardization by nations, industries, and companies, we find a greater amount of activity with each step, because the economic advantages increase with each step.

To be economically sound, a standard must not resist revision and improvement. A standard must represent the best that industry has to offer and it must persist as a standard only until something better has been proved feasible. Evidently the economic aspect of an industrial standard is the critical one in its existence.—K. H. Condit., *The Annals of the American Academy of Political and Social Science*, May.

# The Dilatometer and Its Application

When steel subjected to heating passes through its critical range, the metal ceases to expand and actually contracts until complete transformation has taken place, whereupon expansion is resumed. This change in volume under heat, and the reversal of change at the critical point, has been utilized in an instrument known as a Dilatometer for the positive control of quenching steel for hardening. By the use of the instrument, therefore, the correct quenching temperature is mechanically indicated regardless of the type of steel. Moreover, the steel does not

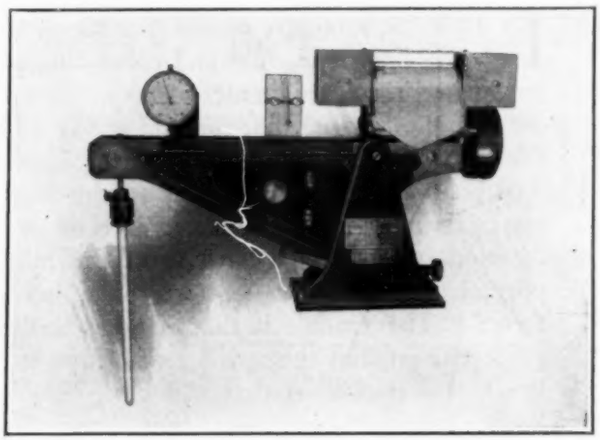


*Fig. 1—The Dilatometer used for heat-treating steel*

cease to expand until it is thoroughly heated throughout its mass, and a positive control is thus assured of proper heating. By arranging a recording chart to show the amount of expansion during the heating period, the rate of heating is also definitely recorded, and by comparison with known rates for steels the proper heating rate for a given steel can be controlled.

The Dilatometer is shown in Fig. 1, and its application to a standard type of furnace is illustrated in Fig. 2. The principle of operation is shown in Fig. 3. In operation one piece of the work is placed in the furnace under the rod *A*, which is brought down to press lightly on the steel. This rod is usually of quartz, although heat-resisting alloys or other materials may be employed. The expansion of the steel piece when subjected to the heat of the furnace forces the rod up against the main lever *B*, which is pivoted at *P*, and this motion is magnified by the lever and transferred to the indicating dial *C*, and to the recording pen carrier wheels *H* through the connection cable *D*. The pen carrier cable, *E*, is a phosphor-bronze ribbon held at constant tension by a spring, so that the effect of strains is eliminated and all movement caused by the expansion of the steel is directly recorded on the chart drum *F*. This drum is given a continuous timed rotary motion by the clock *G*, which functions during the operation of the instrument. At the completion of the critical temperature, or when the steel ceases to contract, an electric bell is also caused to ring to notify the operator of the proper quenching time. The Dilatometer is not a part of a furnace, but is a tool for use with any type of furnace. It is attached to the top or side of either an electric or fuel-fired furnace. The quartz rod is the only part that projects into the furnace. The rod may rest on one piece of the work, or on the top of several pieces piled on one another. As the furnace must be slightly higher in temperature than the work in order that the work may be heated, the usual pyrometers or thermocouples may be used to govern the furnace temperatures.

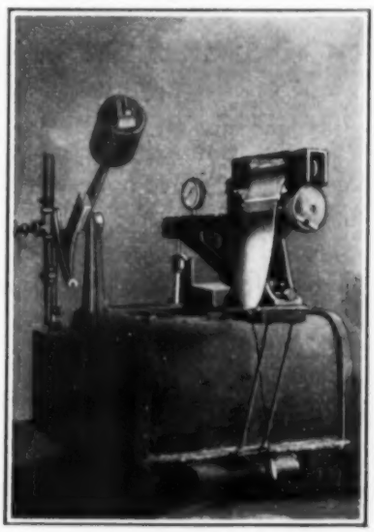


*Fig. 2—Dilatometer attached to a furnace*

The correct quenching moment for steels is at the full completion of the critical transformation; that

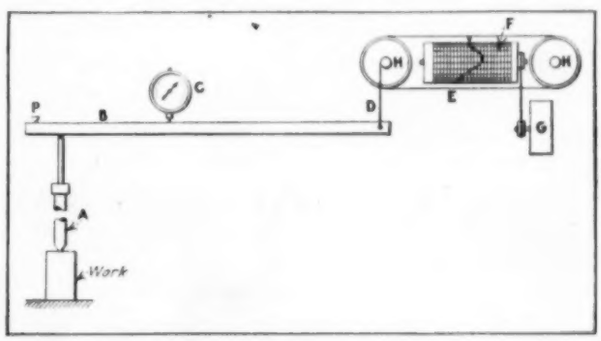



*Fig. 3—Diagram of the recording instrument*

is, when the steel has ceased to contract and has begun again to expand. By former methods of observing temperature only, this point was difficult to judge, with the result that steels quenched before or during the critical transformation were not fully hard, or were apt to crack or warp, while steels quenched above the critical transformation were of abnormal grain size, and were apt to distort.

For the information given we are indebted to The Stanley P. Rockwell Company


© American Machinist

American Machinist

*Editors:* KENNETH H. CONDIT AND FRED H. COLVIN

Established 1877

## *Research Laboratories for Manufacturing Groups*

CO-OPERATIVE research has been advocated many times, but has never been put into effect to nearly the extent it deserves. Inertia, competitive jealousies and the lack of experience in co-operative enterprises are probably to blame.

Steel foundrymen have, however, made considerable progress in co-operation. The Electric Steel Founders Research Group was organized in 1920 and includes five well known firms making steel castings. This group maintains a research laboratory and the result of its work is the common property of each of the group. There is no doubt as to the value of this research to every member of the group, or that they secure advantages over those not so favored.

Every line of industry has many common problems that can be studied to the advantage of the entire group. Few individual concerns in any line can afford all the research that should be undertaken. A central laboratory can benefit the whole group by studying problems that are common to all the members, while individual problems can be studied in the various plants if desired.

Comparatively few problems in machine design and construction are limited to any one field. Bearings and lubrication problems, for example, are common to nearly all lines of machinery.

Builders of machinery of various kinds are beginning to feel that research concerning some of their problems would be well worth while. With the example of the steel founders as a guide it should be easy to make a beginning. And once begun, there is little doubt as to its growing into an established institution.

## *The End Is Not in Sight*

ALFRED P. SLOAN, JR., believes that the marvelous development of the automobile up to the present time is but the beginning of its growth and that the future will see even greater advances. In the same address he made the statement that in manufacturing accomplishment the end is not yet in sight.

If the latter statement is true of automobile manufacturing, and Mr. Sloan is certainly in a position to know whereof he speaks, what a future unfolds for other branches of machinery building and metal working where the art is not so far advanced as in the automobile factories. Truly, there is no place in the shop of today, big or little, for the man with a feeling of complacency in his accomplishments.

And what a tribute to the machine tool builder for what he has done in making the achievements of the present possible. At the same time there is a large responsibility for the future, because no small part of coming developments must be reached through the use of newer and better manufacturing and handling equipment.

## *Is Material Handling Given Its Deserved Attention?*

IN THE manufacture of cast iron pipe 940 tons of ore, limestone, fuel and other things must be handled for every hundred tons of pipe turned out. It is estimated that something like 450 men are involved in the various handling operations. And yet there are many managers who look upon materials handling as a subordinate or auxiliary function, to be coped with after the more important production operations have been perfected. The trouble is that it takes so long to perfect them that the auxiliary function is sometimes neglected altogether.

The kind of management that concentrates all its attention on one phase of manufacturing to the exclusion of the others is the kind that has, so far, overlooked the importance of the automobile truck in the delivering of materials and parts. Some day this management will discover that it is unable to compete with companies that have provided adequate loading and unloading facilities for goods that arrive or leave in motor trucks.

For short hauls the motor truck has certain advantages over railroad cars. Two of the most important are the ease with which the truck can be unloaded, as compared with a boxcar; and the possibility of having the truck deliver at the point nearest to where the contents are to be stored or used, thus reducing subsequent handling. A railroad car, on the contrary, is clumsier and its final location depends on the temper of the spotting crew.

The latter advantage is lost, of course, if the plant engineer and the architect have failed to provide a real unloading dock, one designed to make the most of the mobility of the truck. This point is well worth careful study.

# · SHOP · EQUIPMENT · NEWS ·

## "Canco" Presses

TWENTY-FIVE years' experience in press building and operation has been embodied in the line of "Canco" presses being used throughout the sixty plants of the American Can Company and now being placed on the market by the Equipment Division of the company at 120 Broadway, New York City. The Canco line comprises: Open-back, inclinable presses having accuracy, speed and strength without sacrificing safety; horn and apron presses having many similar constructional features; arch presses suitable for large blanking and forming operations; screw presses for the usual operations performed on this type of machine and particularly adapted to testing dies; toggle embossing presses so designed that shock has been minimized. All of these types are built in a range of sizes suitable for a wide variety of forming operations.

Symmetry in design marks the open-back, inclinable press which is built in plain and geared types available in either standard or deep-throat styles. One of these presses is shown in Fig. 1. The frame, a semi-steel casting, is reinforced at all vital points. All bearings are scraped in and the crankshaft is of chrome-nickel steel, heat-treated. The clutch has six engaging points, making for fast operation. By action of a treadle, a hardened steel block is caused to engage one of the six driving surfaces. The knockout, upon completion of the stroke, is positive, but a lock is provided so that continuous operation can be secured. A pawl, by which the operator is enabled to run the press backward, is a part of the mechanism. This feature is of great value when setting dies. If the pawl is left in engagement, and the press is started forward either by hand or by power, the pawl is automatically thrown out of engagement. Either of two types of brakes can be furnished—cam actuated for presses intermittently operated, and treadle release for presses operating continuously.

Other features include positive knockout, finished surfaces or pads for the application of attachments, feeds and gages, and three steps for inclining. A Dot system of lubrication provides positive oiling. The improved, hardened-steel punch holder is designed so that it gives a better purchase on the punch stem and eliminates marring and scoring.

The plain styles of the standard presses are built in seven sizes, Nos. 1, 2, 3, 4, 4½, 5 and 6, ranging in weight from 860 to 8,413 lb., while the deep-throat presses are made in three sizes, Nos. 2-A, 3-A and 4-A, varying in weight from 1,855 to 4,650 lb. The geared styles are built in six sizes, weighing from 1,170 lb. for the No. 2 to 9,110 lb. for the No. 6 for presses having standard throats, while only one size is made with a deep throat, the No. 4-A, weighing 4,950 lb. The standard length of stroke for all sizes of both types is 3 in. The maximum length of stroke varies from 4 to 6 in. for the ordinary type and from 4½ to 5 in. for the deep-throat type.

*Fig. 1—"Canco" Open-Back, Inclinable Press*

The depth of throat, center of slide to frame, varies from 4 to 11 in. for the standard type and from 7 to 11 in. for Style A, which is the deep-throat type. The die space from the top of the bolster to the slide (stroke down, adjustment down, standard stroke), varies from 5¼ to 7½ in. for the standard type and from 5¼ to 6 in. for Style A. The size of the bolster plate varies from 8x13 to 23x32 in. for the standard throat type, while the size for the deep-throat press varies from 13½x19½ to 22x30½ in. The width of opening through the back varies from 6 to 18 in. and from 10½ to 18½ in. for the standard throat and style A, respectively. The floor space required ranges from 25½x23 to 51x44 in. for standard presses and from 36½x31 to 48x42 in. for the deep-throat presses. The speed of the flywheel ranges from 135 to 80 r.p.m. for the standard style of throat and 125 to 110 r.p.m. for the deep-throat presses.

The horn and apron press is similar in many ways to the open-back, inclinable press and is shown in Fig. 2. The frame is also made of semi-steel. The horn hole is large in diameter, making it possible to have a sturdy shank on the horn. The apron is a semi-steel casting clamped to the column and provided with an efficient elevating device. The means of clamping the apron provides a rigid yet readily adjustable part. The apron can also be fitted with an anti-friction sliding bolster or table, which is a factor in reducing fatigue of the operator.

This horn press is built in six sizes in the plain style and in two sizes in the geared style. The weights of the former range from 980 to 3,715 lb., while the latter have weights of 2,925 and 4,115 lb. The lengths of stroke are 1½ in., standard, and 3½ in., maximum, for the smallest size and 1½ and

6½ in. for the largest size. The depth of throat measured from the center of the slide to the frame, ranges from 4 to 10 in. The diameter of the round opening in the adjustable table varies from 3½ to 7½ in. Sizes of bolster plates at the widest points range from 8x13 to 18x23½ in. The floor space required is 24x20½ in. for the smallest press while the largest machine occupies a floor space of 40x28 in. Horn holes range from 2½ to 5½ in. in diameter.

Large blanking and forming operations are readily performed in the arch press, the construction of which is shown in Fig. 3. Features common to the general line are included, such as semi-steel castings, and the clutch and cam-actuated brake. Ample die space is provided and can be further enlarged by removing the front of the bed, thus making the machine suitable for the use of well-type dies.

The arch press is built in two sizes known as 4-E and 4½-E. The weights are 4,300 and 6,000 lb., respectively, with straight legs. The strokes of the slide, standard and maximum, are 3 and 5 in. for the No. 4-E and 3 and 6 in. for the No. 4½-E. The adjustment of the slide is 3 in. in each case. The distance between the uprights is 28 and 30 in., respectively, and the die space from the top of the bolster plate to the face of the slide (stroke down, adjustment up, standard stroke) is 6 and 6⅜ in. The sizes of the bolster plate with removable front are 26x27 and 28x29 in., while those of bolster plates with solid fronts are 23x27 and 26x29 in. The overall floor space occupied is 40x45 and 42x51½ in., respectively, for presses having straight legs. The geared presses weigh 4,900 and 6,700 lb., have 55 and 45 strokes per min. and occupy a floor space of 43x59½ and 48x70 in., respectively. Both the plain and geared presses are built in inclined-leg and motor-driven types as well as the straight-leg type for which most of the specifications given apply.

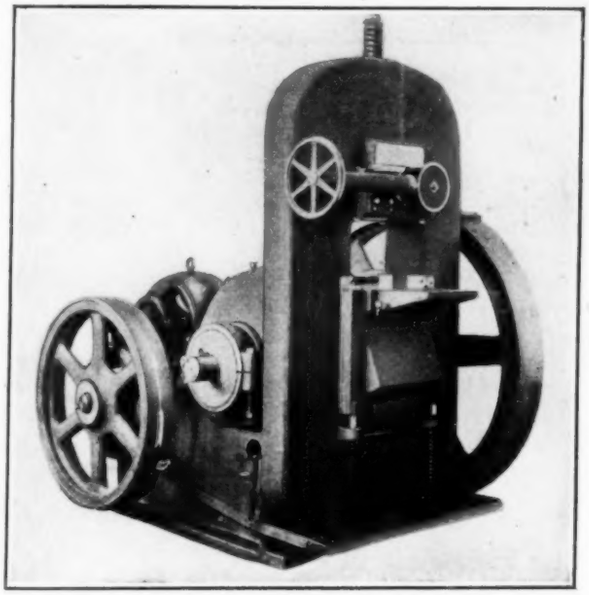


*Fig. 5—"Canco" 1,200-Ton Toggle Press*

The screw press is adapted to testing dies. It is fitted with an auxiliary handwheel forming a round cage frame as can be seen in Fig. 4. This feature eliminates the hazard from an overhanging bar. The press is built in three sizes, Nos. 2, 3 and 4, having weights of 2,475, 3,200 and 4,300 lb. The maximum lengths of stroke of the slides are 7½, 7½ and 8 in. The die space is 11, 11½ and 11½ in., and the bolster plate sizes are 19x20, 21x22 and 24x27½ in. The distances between uprights are 20, 22 and 28½ in. Floor space required is 32x34 in., 35x37 in. and 35x44½ inches.

Compact and powerful construction is featured in the seven sizes of toggle

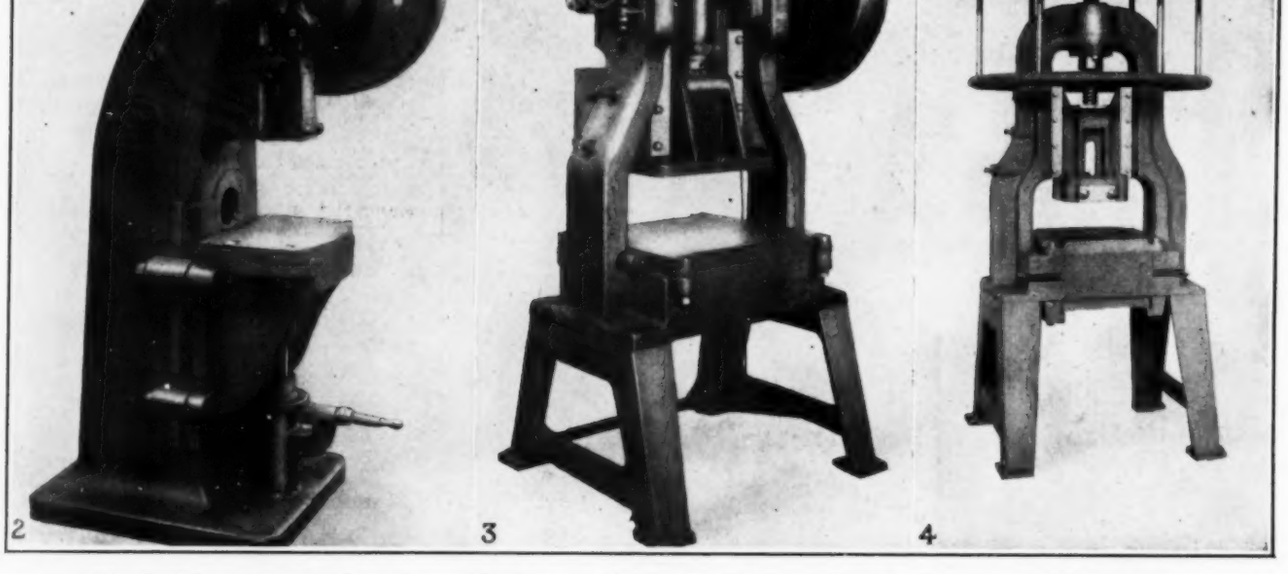



*Fig. 2—"Canco" No. 3 Horn Press with apron. Fig. 3—No. 4½ Style "E" Arch Press having straight legs*
*Fig. 4—"Canco" No. 2 Arch Screw Press*

embossing presses capable of exerting pressures from 150 to 1,200 tons. The first of the series is of the plain type and all of the rest are of the geared style. In Fig. 5 a 1,200-ton press is shown.

The main frame is a solid, annealed steel casting of large section to provide rigidity and freedom from springing. The slide is designed with the toggle lever at the bottom so that the gearing is placed close to the floor. This construction not only eliminates top-heavy appearance but overcomes vibration so that no foundation is required. Furthermore, with the toggle lever at the bottom of the slide, the weight of the slide and the springs in front of the press take up lost motion so that there is no jar when the die strikes the work. The toggle lever is made from a steel casting and the toggle seats and pins are of tool steel, hardened and ground.

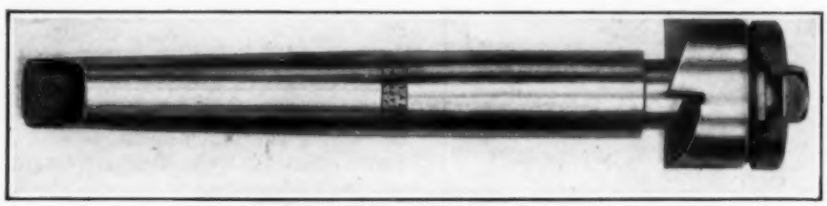
The adjustment of the upper platen is obtained through the action of a steel wedge which is regulated by a handwheel on the left-hand side of the press. A dial adjustment is provided that enables the operator to keep an accurate record of the setting of the dies. A shear pin can be furnished, situated in a readily accessible position for replacement.

The weights of the seven toggle presses vary from 4,200 to 34,000 lb., while the distance between the uprights ranges from $11\frac{1}{4}$ to $20\frac{1}{4}$ in. The maximum die space varies from $12\frac{1}{2}$ to 14 in. The stroke is $1\frac{1}{2}$ in. in every case and the number of strokes per minute ranges from 85 to 35. Floor space occupied is 47x45 in. for the smallest press and 105x100 in. for the largest machine.

## Scully-Jones Reverse Spot Facer

This reverse spot facer made by Scully-Jones & Company, 1909 South Rockwell Street, Chicago, is for back spotfacing or counterboring inaccessible surfaces that cannot be readily faced from above. It consists of an arbor, cutter, horseshoe collar, and holding screw; is simple in design and rigid in construction. The cutter is driven by an integral square which mates with a corresponding square on the solid arbor. This construction results in a strong cutter and gives a grinding life of its full length. The arbors are made of alloy steel, hardened and ground.

Four sizes of arbors are supplied for four ranges of cutters as follows: $\frac{3}{4}$ to $1\frac{3}{16}$ in.; $1\frac{1}{4}$ to $1\frac{1}{2}$ in.; $1\frac{9}{16}$ in. to 2 in.; and $2\frac{1}{16}$ to 3 inches.



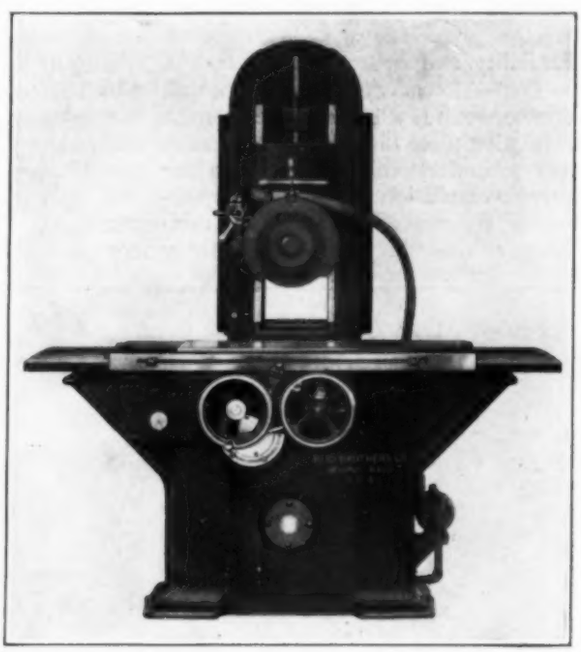
*Scully-Jones Reverse Spot Facer*

## Reid No. 3 Surface Grinder

THIS complete unit, the No. 3 surface grinder, has been brought out by the Reid Bros. Company, Beverly, Mass. The machine requires no countershaft as it can be belted directly to the main drive shaft. Provision has been made, however, so that the grinder can be changed from belt to motor drive at any time.

The bed and column are cast in one piece. The head, which is made in the box form, fits inside the housing of the column. The spindle is driven at a speed of 1,680 r.p.m. by an endless belt from a countershaft in the base. The driving shaft runs at 560 r.p.m. The spindle is 32-in. long, is hardened, ground, and lapped, and has phosphor-bronze tapered bearings. The front of the spindle is $1\frac{7}{8}$ in. in diam., and the rear $1\frac{1}{2}$ in. in diam. The bearings, which have adjustments for both wear and end play of the spindle, are 8-in. long in the front and 7-in. long in the rear. Control of the head is effected by a handwheel which is placed over the grinding wheel guard and travels up and down with the head. The handwheel is graduated in half thousandths of an inch. One full turn of the wheel raises or lowers the head one-tenth of an inch. The graduations are placed upon a 45-deg. bevel, so that easy reading is made possible.

The machine has a capacity to grind work 32-in. long, 12-in. wide, and 12-in. high, under a 12-in. wheel, and in addition pieces of any length and up to 4 in. wide and 11 in. high can be ground crosswise as there is an opening 10 in. wide and 11 in. high under the wheel through the housing. The grinding is done by wheels 12 in. in diam., having a 1-in. face and a 5-in. hole. Form grinding cuts are taken by wheels having a 12-in. diam., a 4-in. face, and a 5-in. hole.



*Reid No. 3 Surface Grinder*

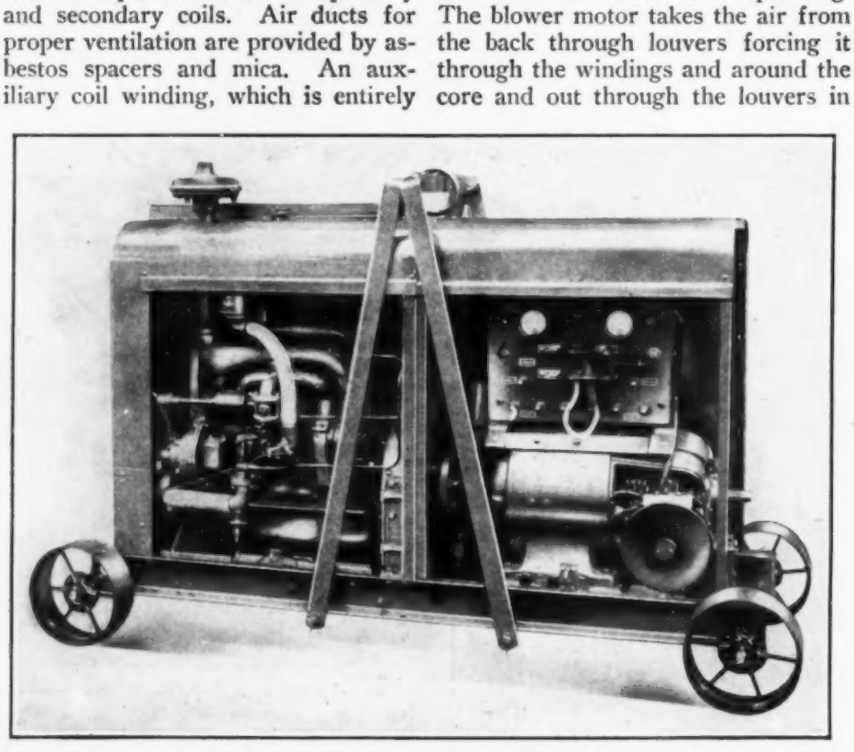
The table has three speeds, and is 50-in. long by 15-in. wide, with a working surface of 32x10 in. Longer tables can be supplied if desired. There are three T-slots for $\frac{3}{8}$-in. bolts,

running the full length of the table. The travel is automatic in both directions, and is controlled by dogs operating against a reverse lever which can be disengaged to permit movement of the table beyond the reversing point. Quiet starting and stopping of the longitudinal feed is a feature of the machine, and is accomplished by a control handle easily accessible. The grinder feeds at each reversal of the longitudinal travel in either direction. The cross-feed mechanism may be disengaged to permit hand-feed by a simple movement of the adjusting screw. The floor space required is 90x72 in. The weight is 4,000 pounds.

## "Alternarc" and "Dualarc" Welding Equipment

TWO lines of welding equipment known as "Alternarc" and "Dualarc" have been announced by the Electric Arc Cutting and Welding Company, 152 Jeliff Avenue, Newark, N. J. The Alternarc cutting equipment is particularly adaptable to the cutting of cast iron, malleable iron and non-ferrous metals, while the welding equipment is said to deposit metal that is not porous, with a smooth surface, due to the rapid puddling action. The Dualarc welding equipment has independent control of amperage and voltage providing a wide range of flexibility and heat control.

The Alternarc welders are all double wound, with heater-plate mica insulation placed between the primary and secondary coils. Air ducts for proper ventilation are provided by asbestos spacers and mica. An auxiliary coil winding, which is entirely separate from the primary or power winding, is provided. The current and voltage control is obtained by means of a flux diverter with a graduated scale. The core and winding of the flux diverter are built up in the same manner as the main coils. The adjustment of the current is obtained by means of a nut and screw arrangement which raises and lowers the diverter. Separable plug connectors are used to vary the current step by step. The external plugs for current variations are made with a taper spring fit to give maximum contact when they are inserted. Ventilation is effected by a blower motor which is connected as an auto-tap on the primary winding so that it operates when the machine is operating. The blower motor takes the air from the back through louvers forcing it through the windings and around the core and out through the louvers in the front of the machine. These machines are designed for ordinary factory wiring circuits but can be built for any voltages or frequencies desired.



*"Dualarc" Model S Gas-Engine Driven Generator*

The welding equipment is built in Models J and B. Model J is suitable for garages and sheet-metal shops. It is built in sizes from 100 to 400 amp. and can be built to operate on any a.c. voltage, such as 220, 440, 550 or 660. The Model B welder meets the demand for an all-purpose production machine. It is efficient for both heavy- and light-welding operations and may be used as a cutter for light-duty work. The Model B is rated at 200 amp. N.E.M.A., 30 to 300 amp. continuous manual welding. Model C is rated at 300 amp. N.E.M.A., 40 to 400 amp. continuous manual welding. Either of these machines can be made for any power supply.

The Alternarc cutting equipment is built in two sizes, Models F-650 and H-1,200. Model F-650 will cut continuously using from 300 to 650 amp. It is designed especially for rivet cutting and leaves the hole free from scars. Model H-1,200 taking from 600 to 1,200 amp. is used for scrap cutting and foundry work. Model W-600 and Model W-1,000 are made for 110 volts to operate with electric-furnace transformers.

### Automatic Current Adjustment

The Dualarc generator will act as either a compound- or differentially-wound machine, giving maximum efficiency when using either the carbon or metallic arc. The generator is self-excited and is so designed that the series field cannot reverse and overbalance the shunt field. It is provided with a special feature making it possible to be short circuited indefinitely without injury. The generator is provided with interpoles which insure steady commutation under all welding conditions. An efficient reactor of open-circuit open-core type, which adjusts itself progressively to current requirements, is provided. Ball bearings are used throughout.

The switchboard is a black slate panel on which are mounted a voltmeter, an ammeter, a double-pole, double-throw series-field switch, a field rheostat and plugging-in terminals for welding leads and amperage control. Grid resistors are

mounted on the back which give wide control of the current in conjunction with the plugging-in terminals on the front. The field rheostat gives an independent control of voltage.

These welding generators may be either motor or gas-engine driven. Drive motors for the motor generator sets are of the standard induction type with welded rotor bars. Motor and generator are close coupled, forming a strong, rigid unit which cannot get out of alignment. The shaft coupling acts as a ventilating fan, drawing the air from the outside ends of the motor generator and exhausting it through a screen outlet. Where a gas-engine drive is required it is of the 4-cylinder 4-cycle type, provided with pressure-feed oiling. The Continental power unit, Model P-20, is standard, although other models may be supplied if desired. Generators, motor-generator sets, and gas-engine driven sets are built in sizes having ratings of 150, 200, 300 and 400 amperes.

## Allis Type L-A Single-Phase Squirrel-Cage Condenser Motors

High efficiency and power factor due to the use of a condenser are characteristics of the type L-A single-phase squirrel-cage motors which have been introduced by the Louis Allis Company, Milwaukee, Wis. The efficiencies range between 70 and 90 per cent, and the power factors between 85 and 100 per cent. The motors are built in capacities of from ½ to 5 hp. and operate on 110 or 220 volts, on any one of the following frequencies: 25, 30, 40, 50, and 60 cycles.

This motor is recommended for applications requiring low starting torque, such as fans, blowers, grinders, buffers, and motor-generator sets. For such service, the motor starts smoothly and operates quietly. The starting torque can be adapted to a particular application by providing the proper condenser.

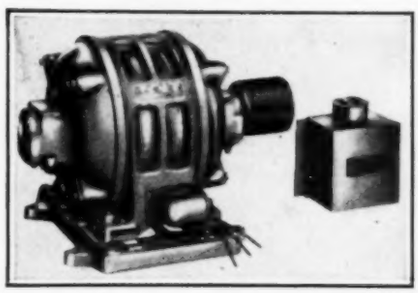


*Fig. 1—Allis Type L-A Single-Phase Squirrel-Cage Condenser Motor shown with condenser*

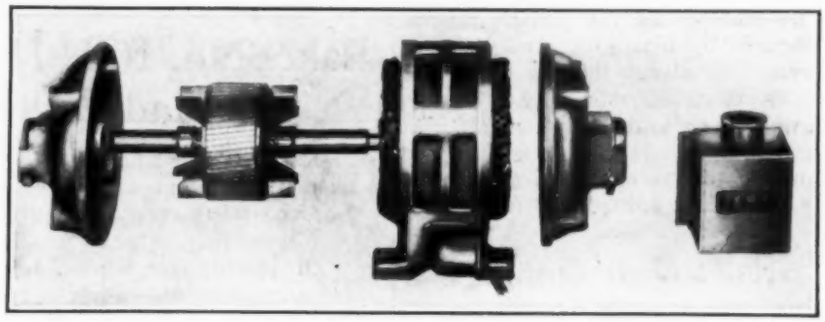


*Fig. 2—The L-A motor knocked down to show constructional details*

These L-A single-phase motors are built for standard speeds from 450 to 3,600 r.p.m. For low speeds the power factor is higher, due to the condenser. These motors can be used for either constant-speed or variable-speed applications. A speed variation down to 40 per cent below normal speed can be obtained, due to the absence of sparking. These motors are suitable for installation in an atmosphere of combustible dust or gas. The condenser is completely sealed in the sheet-steel box, and the leads are brought out to a terminal housing suitable for conduit connection. Brackets are provided for convenience in mounting the condenser on the driven machine, or on the wall in the wiring circuit.

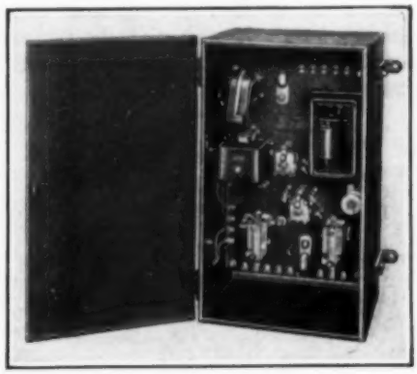
## General Electric Automatic Welding-Head Control Panel

The feed of electrode wire is stopped a short time before the shutting off of the welding current at the end of a welding operation when this control panel is used in connection with the automatic arc-welding heads made by the General Electric Company, Schenectady, New York. The apparatus serves two purposes: First, it clears the electrode from the weld, and, second, it causes the crater left at the end of the weld when the arc is cut off short, to be filled.

According to the manufacturer, it is desirable to have the electrode clear of the weld when removing the work from the clamping fixture, to prevent the end of the wire from dragging. This is of particular importance with large sizes of wire. It is also important to eliminate the undesirable crater, as its presence is objectionable, especially on circular welds of small diameters where one end of the weld is lapped over on the other end.

The General Electric control panel for its automatic arc-welding heads is controlled by a "start-stop" push-button station. Mounted on the panel are a line contactor of suitable size for the welding current, an arc-voltage-regulating relay, and relays for controlling the travel motor and for clearing the electrode from the weld. The rheostats for controlling the arc voltage and the speed of the electrode motor are mounted on the outside of the sheet-metal inclosing case. A small meter panel is used for instruments indicating the arc voltage and welding current.

In operation, when the end of the weld is reached, the operator pushes the "stop" button which opens the auxiliary contactor. This, in turn, stops the electrode motor and opens the magnetic-clutch circuit, thus stopping the wire feed. The line contac-



*General Electric Automatic Welding-Head Control Panel*

tor remains closed for a short time because of the action of a time-delay relay. This allows the arc to turn back the electrode sufficiently to clear the weld and also to fill in the crater. The time-delay relay then opens and, in turn, opens the line contactor, and stops the travel motor.

## "Arlok" Drill Bushings

Two types of drill bushings for jigs are being offered by the Universal Standard Company, 12121 Cardoni Ave., Detroit, Mich. The standard "Arlok" bushings and liners are shown in Fig. 1. In Fig. 2 the press-fit bushings are illustrated.

The "Arlok" bushings are recommended when a great many holes are to be drilled or severe duty is encountered. This bushing may be changed or replaced by the operator. The liners are free from obstruction and can be lapped easily. It will be noted in Fig. 1 that the seal at the head of the "Arlok" bushing prevents chips from getting into the lock. These bushings and liners are made in drill sizes up to 2 in., with outside diameters from ½ in. to 3 in. and heights up to 2⅜ inches.

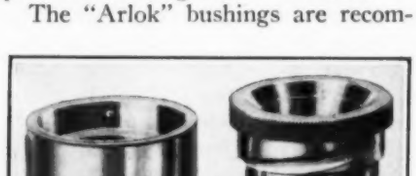


*Fig. 1—"Arlok" Liner and Bushing*

The press-fit bushings may be used when the wear of the bushing is not severe. The tubular bushings are used when it is required that the bushing be flush with the jig plate. Both of these press-fit bushings are made in the above drill sizes.

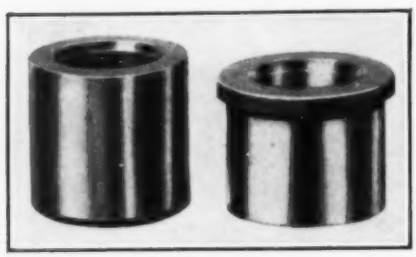
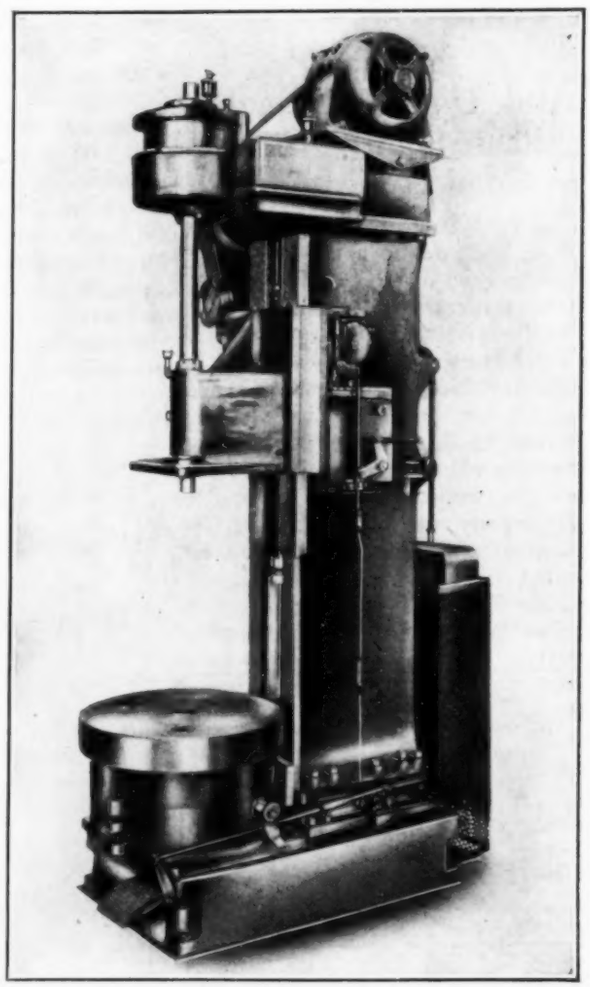


*Fig. 2—Tubular Press-Fit Liner and Headed Press-Fit Bushing*

## Baker No. 10 H Hydraulic-Feed Boring and Drilling Machine

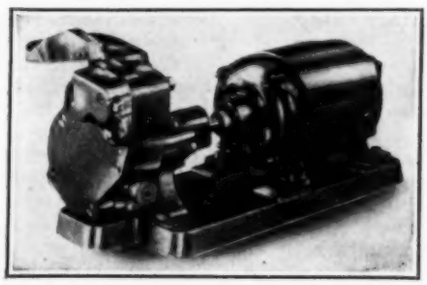
HYDRAULIC feed has been applied in the boring and drilling machine which has been announced by the Baker Bros., Inc., Toledo, Ohio. The machine has the features of rapid advance to the work, automatic tripping to the feed that has been set and automatic rapid return to facilitate production. The points of change from rapid advance to feed and to rapid return can easily be changed by cams mounted on the side of the saddle. The illustration shows the machine fitted with a flanged head to which a multiple head is to be attached, but it is not shown. This machine can be fitted with either a single- or multiple-spindle head. The single-spindle machine has a No. 4 Morse taper in the spindle, which has a diameter of 3¼ in. A 3-in. vertical adjustment to maintain the proper setting of the tools is provided in the multiple-spindle machine. The machine can be furnished only as a motor-driven unit, the motor being mounted on the top of the machine as shown. Power is transmitted to the main drive shaft by means of a Texrope drive. The Oilgear pump is driven from a belt running from the main drive shaft so that only one motor is required to drive the entire machine. A 10-hp. 1,200-r.p.m. motor will furnish ample power. The main vertical drive shaft which is 2 in. in diam., is driven at speeds ranging from 165 to 245 rev. per minute. The saddle, which is 20 in. long, is mounted on scraped ways of ample proportions to maintain alignment. The travel in the head is 16 in. The machine can be fitted with a plain table for single-spindle work, or with an indexing table 24 in. in diam., as shown in the illustration. Any number of indexes can be provided for the latter. The available feed capacity is 5,000 lb., acting through a cylinder with a bore of 2.875 in. A wide range of feeds can be secured by adjusting the Oilgear pump.



*Baker No. 10 H Hydraulic-Feed Boring and Drilling Machine*

## Model A-10 Unishear

Any line, whether straight, curved, or irregular can be followed through 10-gage sheet metal with this Model A-10 Unishear with a cutting speed of 10 ft. per min. The machine is similar in principle to other units de-



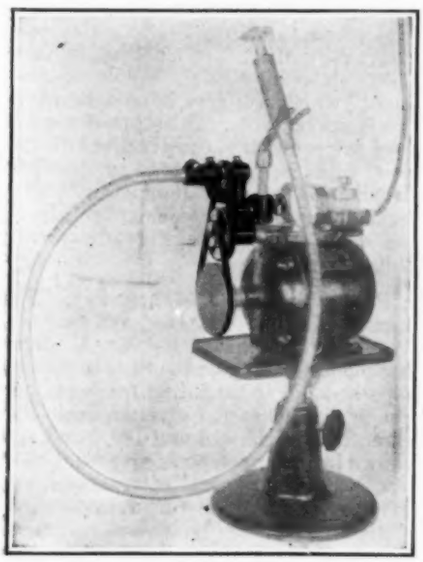
*Model A-10 Unishear*

veloped by the Unishear Company, Inc., 270 Lafayette St., New York, N. Y. It will also handle notches and angles. No time is lost in filing or trimming down the work to the desired outline, after the use of this machine.

The model A-10 Unishear is driven by a ¾-hp. motor running at 3,450 r.p.m. on either 115- or 230-volt d.c. or 110- or 220-volt a.c. at 60 cycles on either single-phase or three-phase circuits. In addition, motors can be furnished for 110 or 220-volt, a.c. 25-cycle, single-phase circuits. Furthermore, either the proper motor starter or a sheet stabilizer can be furnished. The weight of the machine is about 165 pounds.

## Strand High-Speed Flexible-Shaft Attachment

This high-speed flexible-shaft attachment for operating small grinding wheels has been developed by N. A. Strand & Company, 5001 N. Lincoln St., Chicago, Ill. As shown in the illustration, this device is a compound pulley drive. This design is interchangeable with the No. 4 and No. 5 flexible-shaft grinding machines manufactured by the above company. It is constructed with ball bearings throughout, and can be attached in less than one minute.

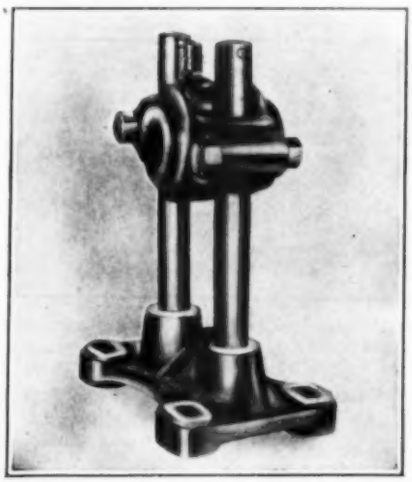


*Strand High-Speed Flexible-Shaft Attachment*

Ball-bearing wheels up to 2 in. in diameter may be operated at 10,000 r.p.m. by this device. A ball-bearing hand piece with ¼-in. collet or regular ball-bearing hand spindle are also provided to use in conjunction with this attachment.

## Boston Type BF Self-Aligning Hangers

The Type BF hanger is a high-grade, fully self-aligning, ball-bearing hanger developed by the Boston Gear Works, Inc., Norfolk Downs, Mass., and marketed by the Boston Gear Works Sales Company.



*Typical Boston Type BF Self-Aligning Hanger*

It can be readily fastened to the shaft at any point, is capable of maximum height adjustment, and is constructed so that it remains rigid after proper adjustment has been made. The shaft bore for these standardized Type BF self-aligning hangers is supplied in fractional dimensions.

These hangers are suitable for use as outboard bearings in connection with the operation of speed reducers and chain drives. They are stocked for immediate delivery at all Boston Gear service stations.

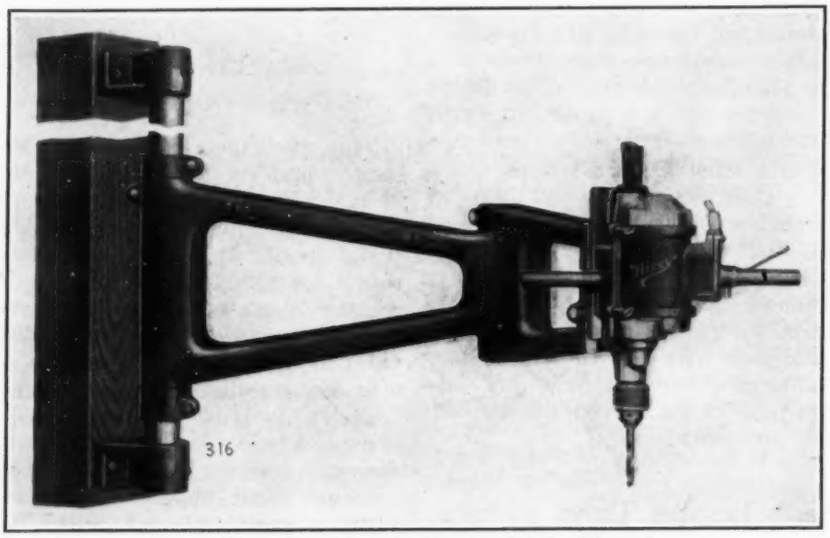
## General Electric Protective Cream

This protective hand cream has been placed on the market by the Merchandising Department of the General Electric Company, Bridgeport, Conn. It is furnished as a safety measure to those men in the company's plants whose hands and arms are exposed to oil, grease, dirt, varnish, paint, and other causes of skin discoloration and irritation encountered in industrial processes. It is applied before beginning work and forms an invisible film which quickly dries and is not slippery. Subsequent washing in warm water quickly removes the film, and with it the stains which otherwise fill the pores of the skin and are difficult to remove, and likely to cause infection. This cream is packed in tubes for individual use and also in 1-lb. cans for industrial use.

## Hisey-Wolf Sensitive Double Radial Drilling Arm

Double arms which can be swiveled through wide ranges of arc and then locked in position constitute the principle feature of the sensitive radial drilling arm introduced by the Hisey-Wolf Machine Company, Cincinnati, Ohio. The apparatus can be furnished to carry all Hisey portable electric drills up to and including the ⅞-in. size.

This double sensitive radial arm is mounted on a ball thrust bearing which is inclosed and dust-proof. This construction reduces friction to a minimum, thus permitting quick and easy adjustment. The vertical adjustment is made by means of a lever through a rack and pinion and equals 7½ in. The vertical adjustment on the main column, which is 2½ in. in diam., equals 25 in., so that a total vertical adjustment of 32½ in. is possible. By means of the individual swivel clamps, either the long or short arms can be locked independently, and, if the work requires it, both arms can be locked in any fixed angular position. The full arm length will swing through an arc of 240 deg., and the short arm has an angular adjustment of 245 deg. The




*Hisey-Wolf Sensitive Double Radial Drilling Arm*

maximum arm reach from the column to the drill spindle is 36¾ in. The lever feed is operated through a rack and pinion the same as on a drill press, thereby permitting positive and sensitive control without fatigue to the operator. The net weight of the device is 215 pounds.

## "Typhoon" Models B and C Coolant Pumps

These coolant pumps, models B and C, have been introduced by the Tuthill Pump Company, 131 West 63rd St., Chicago, Ill. The model B pump was designed for pressure lubrication of machinery and for hydraulic feeds. It operates on the internal-gear principle, and has a "Two-zone" packingless feature, employing a metallic seal which insures freedom from leakage at pressures as high as 500 lb. per sq.in. and 28 in. of vacuum on lubricating oil. The model C pump was designed for pressures up to 200 lb. on lubricating oil.

Two sizes of the model B pump are available, the No. 00 size having a capacity of 30 gal. per hour, and the No. 0 size having a capacity of 90 gal. per hour at 1,800 r.p.m. Both sizes may be obtained with either a foot mounting or the flange mounting as shown in Fig. 1. The flange mounting is convenient when the pump is built into the machine.

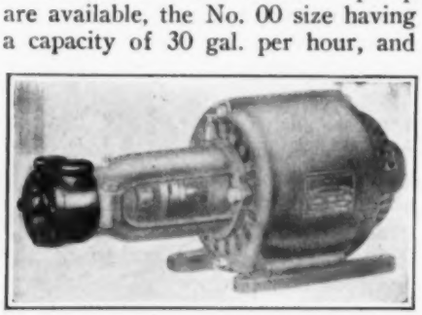


*Fig. 1—"Typhoon" Model BF Pump adapted to a Janette motorized unit*

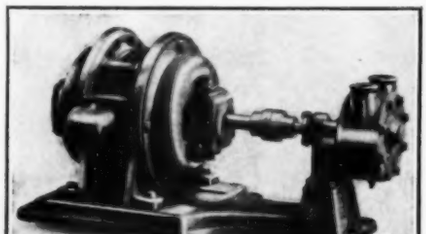


*Fig. 2—"Typhoon" Model C Motor-Driven Pump*

The model C pump can be furnished for either belt- or the direct-motor drive shown in Fig. 2. It is built in six sizes having capacities from 1.5 to 45.5 gal. per min. at 1,200 r.p.m. and 100 lb. pressure.

## Trade Catalogs

BALL BEARINGS. The McGill Metal Co., Valparaiso, Ind., has published a catalog showing the Schubert ball bearings of both the radial angular contact and thrust types. The various constructional features are fully described and are illustrated by means of photographs. Tables are then presented which show the sizes obtainable. The properties and uses of McGill metal, which is a special aluminum bronze alloy, are given. The catalog contains 40 11x8½-in. pages.

GARAGE EQUIPMENT. The Hobart Brothers Co., Troy, Ohio, has published a 20-page three-color catalog describing various types of garage equipment. Among these are HB constant-potential charging outfits and accessories, test benches, compressed-air outfits, spray-painting equipment and car washing equipment. HB ball-bearing, equipped buffers and grinders are also mentioned. The catalog is illustrated throughout by means of colored illustrations and has eighteen 11x8½-in. pages.

HERRINGBONE GEARS. The W. A. Jones Foundry and Machine Co., Chicago, Ill., has published Catalog No. 36, which contains tables of cut herringbone gears, of the continuous-tooth type, ranging from 2½ to 10 D.P. The tables contain the horsepower ratings per inch of face of these gears. The tooth forms and the dimensions thereof are also shown. The booklet contains 24 7½x5-in. pages.

MARKET AND QUOTATION SERVICE. The *Engineering and Mining Journal*, published by the McGraw-Hill Publishing Co., New York City, has prepared a booklet describing the market service that it renders. Weekly publication is made of information and comments on market conditions and current quotations on every important ore, metal and unmanufactured mineral product except fuels. Subscription is invited to this special service which consists of distributing by mail or air mail advance proofs of the market pages, supplemented by advance information as to the volume of sales and as to prices and averages via telephone, telegraph or cable immediately upon compilation. This is the only agency that attempts to supply information of this character in such scope and authoritativeness.

OUTDOOR LIGHTING UNITS. The Holophane Co., Inc., 342 Madison Ave., New York City, has published a pamphlet describing the "Wide Spread Light" which will give illumination over a widespread area. A sectional view is used to show the construction of this unit, while a chart is used to show the distribution of the illumination. This light is suitable for factory entrances, the outside of buildings, roadways and shipping platforms.

PIPE THREADING MACHINERY. The Landis Machine Co., Inc., Waynesboro, Pa., has published catalog No. 31 showing pipe threading and cutting machines, pipe and nipple threading machines and chaser grinders. Constructional features of the chasers and die heads are shown by numerous photographs. Tables of specifications and dimensions are given for the heads. Illustrations of the various machines built and tables of specifications are presented. The catalog contains 54 9x6-in. pages, and is attractively printed.

# NEWS OF THE WEEK

## Survey Says Profits Are Increasing

*Cost accountants hold ninth conference*

PROFIT Trend in American Industry was the opening technical topic of the Ninth International Cost Conference held at Hotel Commodore, June 11 to 14 inclusive. The session centered on the survey of the Research Department under the direction of H. A. Bullis, the data being secured from various sources including questionnaires to over 15,000 concerns. The result showed that, although profits had decreased in some industries, and with some of the smaller concerns in all industries, the trend of profits had been upward ever since 1923, in spite of general belief to the contrary, the increase in some industries being as much as 27 per cent. Statements both by business men and trade association officials in those industries deprecated the lowered profits due to price cutting in the endeavor to fill the factories, even in face of the upward trend cited. The report indicates that profits of small firms in all industries have declined, but that larger concerns in the same industry have earned more than before.

Col. Robert H. Montgomery deprecated the tendency to draw conclusions from generalities. He pointed out the necessity for keener business management, for the elimination of waste both in management and in industry, urged the maintenance of fair prices, the utilization of trade associations and the production of only such goods as could be sold at a profit.

Banker control was also discussed and cost accountants were urged to cease dealing entirely with post-mortems but to pay more attention to the conditions of today and tomorrow. It is not enough to know that a profit was made last year. It is necessary to know how things are going this month and how they are likely to be next year. They must not only show trends, but find their causes.

Reduced cost of manufacture due to increased quantity must be balanced against the increased cost of selling the larger production. It will frequently be found that there is more net profit in the smaller sales. If it is necessary to change models frequently to secure increased sales, the increased production cost must be balanced against greater volume of business. While standardization and mass production give low manufacturing costs, they may so increase sales costs as to reduce or eliminate profit. All of these factors must be balanced, or compromised, to secure the greatest net profit to the manufacturer.

The second technical session was devoted to a discussion of "The Determination of Labor Standards for Costs and Wage Incentive Plans," and was divided into three groups—one on job time standards, one on group standards and one on unit time standards. The speakers were: W. L. Walker, vice-president, the Washburn Co.; Warren H. Conn, director of standards, Hood Rubber Co.; W. F. Hosford, vice-president, Western Electric Company.

Mr. Walker's paper dealt with the essentials of installing and operating an incentive wage payment plan based on job time standards. He emphasized the necessity of developing control over physical conditions, material, operations, machinery, and tools. The relationship of established standards to costs was developed in some detail. Gains in production per unit of time under "job time standards" frequently ran from 100 to 200 per cent.

Mr. Conn's paper referred to the so-called "Point System." Mr. Hosford's paper dealt with the development, installation and advantages of group bonus as a form of wage payment. Of the 24,000 workers in the manufacturing department at the Hawthorne and Kearny plants of the Western Electric Co., 85 per cent of those on productive labor are working under some form of wage incentive, and 23 per cent of those on indirect labor are similarly on an incentive basis. About 60 per cent of the productive workers are on "gang piecework" or operating under a group wage incentive. This plan has four adaptions: Weekly gang piece-work; bi-weekly gang piece-work; monthly gang piecework; and gang premium.

The third session on the simplification of industrial accounting was organized by Prof. T. H. Sanders, of Harvard University. One of the principal speakers was Floyd H. Rowland, of Floyd H. Rowland & Co., who spoke on the "Simplification of Industrial Organization." Mr. Rowland said the simplification may be achieved by two main methods—by definition or by expansion. Simplification by definition he explained as including, first, a thorough market analysis for each territory and each product; second, the setting up of a sales budget for individual products in individual territories; third, the predetermination of inventory and purchase requirements; fourth, the determination in advance of the manufacturing requirements to conform to the rest of the program, and the laying out of manufacturing schedules; and fifth, the establishing of predetermined standard costs. He also emphasized the necessity of defining the organization of the company, so as to eliminate the danger of overlapping of responsibility and authority. Simplification by expansion meant by merger.

At the fourth session, plant and property records, appraisals and depreciation were discussed. At the fifth session, the first topic discussed was the 13-month year. The second was a discussion of depreciation on the basis of cost of replacement values, the principal paper being presented by E. F. DuBrul, executive secretary, National Machine Tool Builders' Association. Mr. DuBrul argued that if it is good business to insure property at replacement value in order to get it back in the case of sudden loss by fire, then it is equally good business to get your property back from your customers at that value through depreciation to cover slow loss.

The last session was on the subject: What standard costs are doing for the reduction of costs in the production and distribution departments. This session formed a logical sequence to the series of meetings on standard costs at former conventions. Ten speakers gave the actual experience of their companies.

## France Foresees Stabilization of the Franc and of Business

*Automotive and rolling stock production improved*

BY OUR PARIS CORRESPONDENT

With Monsieur Poincaré and his policies returned to power as a result of the recent elections, and this in spite of some surprising communistic gains in the Chamber of Deputies, generalities point to the fact of a stabilizing of both the franc and general economic conditions. As a matter of fact, only two industrial phases have as yet given signs of this improvement, that of the automobile and of railway rolling stock production which have manifestly improved their positions. Export prices are rising in most metallurgical lines.

Wholesale prices in the metal transforming industries have increased their index figures only a few points since the first of the year, being actually, for minerals and metals, 589 as against 575 February last. The drop in some instances is the equivalent of a hundred points or more from the figures of July, 1926.

The general index shows national products at 615 as against 601 and imported products at 673 as compared with 660. The ensemble of food stuffs has risen from 660 to 673 and in the last month bread has risen 10 centimes per kg. loaf—a factor that affects the mentality of the French worker not inconsiderably.

It seems more than likely that the franc is on the eve of stabilization at virtually the present dollar value of 25 francs, 40 centimes. In the middle of May, the Bank of France advance to the government swelled 850,000,000 francs and note circulation 922,000,000 francs, but the former has been reduced for the major part during the latter part of the month. The whole barometric fluctuation may or may not have been a political manoeuver, but it was significant coming on the very eve of the elections.

The stabilization loan, so called, which was effected immediately after the elections produced something like 10,000,000,000 francs ($400,000,000) but the government has big partial payments on war debt account to the United States and Great Britain which are due in June. The effect of stabilization should be to favor long term contracts which in turn should help American export trade to France and for that matter help French home and foreign trade alike.

### Exports Satisfactory

Exports, particularly to the colonies, are considered satisfactory under existing conditions, though figures both as to tonnage and valuation are disappointing when examined in detail and show notable discrepencies from figures of the same period last year, when the gold value of the franc stood practically where it stands today.

The Normalization Committee of the metal trades is progressing with its standardization plans for bolts, nuts and screws, and washers and gaskets, aided as it is by the technicians of the government arsenals and armament works and the automobile, locomotive and agricultural machinery industries. A fresh bulletin of normes has just been published. There is a movement towards rationalization in many mechanical industries but nothing seems actually to have been accomplished towards the fusion of small plants that overlap, largely due, it is said, to mutation taxes which in some cases run as high as 22.5 per cent and never below 7, thus cutting prospective dividends of the next few years just that much. No one seems to want to take the plunge.

The Comité des Forges suggest propaganda plan for its members for the "development of the use of steel in all its forms." This policy may mean that many producers of semi-fashioned metal products will enter the fabricating field and work them up themselves, at least so far as finished parts for the automobile and motive power industries are concerned. This is a step forward that in many lines has not been noted heretofore in French industry.

There is a rumor of an imminent formation of a cartel or trust of French steel foundries working to pattern for the outside trade. It remains to be seen whether prospective profits resulting from such operation are to be passed on to the consumer or kept within the organization. The project is stated as being destined to keep specialized industry in full production and the lining up wasteful competition.

### Market Situation

Machine tools are considered as satisfactory among large makers, but price competition is lively. Sales of agricultural machinery have been considerably retarded by the late spring. Naval construction shows an unusual activity, several units being built for foreign merchant navies.

Boiler tubes are in demand.

Prime movers, both fixed and portable, are in growing demand and there is evidence of a heavy oil motor for automobiles about to be put on the market by the old Peugeot firm.

The "Constructors d'Organes de Transmission" complains of arduous price and credit conditions on prime materials and states that ruling prices will have to be considerably raised.

Aluminum metal and its fabrications appear due for a price re-adjustment after the recent drop brought about by the international combination both for domestic orders as well as for export. It is recognized that even the new aluminum alloys are having strong competition from light pressed steel stampings which have been making inroads on aluminum progress for long past.

Machine wire prices on a base of 800 francs per metric ton are pegged as stationary until July. All wire products are stable, as are steel sheets and plates. Steel stampings have picked up as a result of the spring automobile activity as well as for demands by the railroads, though there is strong price competition.

French rolling stock makers are looking to export business and are viewing with some apprehension the new German combination of manufacturers in this line. The same observation applies to the small tool consortium just brought into being in the Essen district. France also notes with some real concern the stride into which the German automobile industry is getting as possibly affecting the really important export of French light cars to Germany in the past three years. Various other metal transforming industries are marking the same tendencies.

Steel stamped furniture is making some progress in France though still a novelty but prices are rising, the inference being that production methods have not kept pace with the demand. General hardware is being more and more sold to dealers direct without passing through the middleman, but in spite of this deliveries are long drawn out.

Imports of raw material during the first four months of the year showed a falling off of 1,302,560 metric tons, while there was a slight increase in manufactured products imported. Exports of manufactured products also fell slightly. Nevertheless, manufactured imports increased in value 505,567,000 francs, while exports of the like fell a similar amount in value. Total imports exceeded exports by rather more than half a billion francs. The balance of trade, while not in favor of France is as favorable, however, as could be expected.

The Citroen automobile plant has been inundating the columns of the classified newspaper ads recently with demands for specialist workers. It is rumored that a six-cylinder car is to be put out for next season. The automobile industry in general is at its productive height, but not full capacity.

Car loadings in the first week of May, totalling 381,879, were lower than at any week in 1927. What is to be noted, however, is that while American car loadings run scarcely over a million a week, the showing in France would seem formidable except for the fact that they are mostly 10- and 20-ton cars, the former predominating.

A minor labor trouble has developed among pattern makers in the north and has brought about an employers' lockout which is thought will be of short duration.

## Calkins Addresses Pressed Metal Group

In giving a buyer's impression of what is wrong with the present methods used by salesmen of pressed steel products, William B. Calkins, general purchasing agent of the Willys-Overland Co., stated that he thought the outstanding need of the industry was the development of cost-finding methods so that costs could be figured accurately. It often happened that price revisions up to 25 per cent were possible when a proper study of costs were made. To develop cost finding, it is desirable that the manufacturing, estimating and sales departments collectively and carefully go over the subject and anticipate how new methods and conditions can be applied to the production of the article. The company that tries to make an intelligent study of the requirements of the customer is in a much better position to get the business than one that merely quotes on the job on hand. Proper control of the purchase of raw materials is another angle of the cost situation, Mr. Calkins stated.

He deplored the fact that so much "trading" is done, because the salesman has two prices—the ask and the take. So-called high pressure methods have little effect, except perhaps a detrimental one on an alert purchasing agent.

After presenting his address, Mr. Calkins submitted to detailed questioning as to purchasing policies and his various impressions on certain sales methods. This talk was the principal event of the June meeting of the Pressed Metal Institute, held in Toledo, June 7. Previous to this, the light stampings group and the heavy stampings group met separately to discuss matters of common interest. Besides these groups, a third is in process of formation consisting of manufacturers making similar products.

# Analysis of Industrial Machinery Imports into India

In Table I is given the value of imports into India of industrial machinery as well as the percentage of value to total imports of each of the principal countries of the world. The figures are based upon the fiscal period from March to March. It should be noted that the total value of imports in the past fiscal year decreased 13.4 per cent as compared with the period immediately preceding and 6 per cent compared with the 1924-25 period. Imports into India from the United States have shown a constant increase on a percentage basis, although decreasing in value. Those from the United Kingdom, on the other hand, have shown a steady decrease in percentage, while Germany and Austria's imports have increased in both percentage and value.

It is of interest to note that whereas the United Kingdom imports decreased approximately $5,000,000, or 15 per cent the imports from the United States only decreased $300,000, or 9 per cent, and imports from Germany increased only $130,000 or 5 per cent. Imports from Japan are showing a steady decrease and have now become an insignificant factor in comparison with their trade of a few years ago.

Certainly on such items as steam engines, gas engines, refrigerating machinery, metal-working machinery and sawmill and woodworking machinery, American products are being purchased in greater quantities and are beginning to hold a fairly strong position in this difficult market. Furthermore, from Table II, showing the breakdown analysis, it will be seen that in many other classes of industrial machinery where the United Kingdom has dominated the market American manufacturers are slowly increasing their sales. With the exception of mining machinery, the losses in imports from the United States were comparatively small.

As the decrease for the period 1926-1927 has been general with exception of imports from Germany the outlook for American manufacturers does not look unfavorable. In fact the general trend of trade shows American manufacturers are becoming more firmly established each period with the general outlook favorable for a further increase in business.

Although Canada has been included in the imports from the United States their total for the period 1926-1927 was only Rs. 27,280 or less than ¼ per cent. of the American total. It is probable that the bulk of these Canadian exports to India originated in the United States.

Table I—Comparison of Imports of Industrial Machinery From the Principal Countries Into India

| | 1924–25 | | 1925–26 | | 1926–27 | |
|---|---|---|---|---|---|---|
| Country of Origin | Per Cent of Value to Total | Value of Imports U. S. Dollars | Per Cent of Value to Total | Value of Imports U. S. Dollars | Per Cent of Value to Total | Value of Imports U. S. Dollars |
| United States and Canada | 8 | 3,131,932 | 8.63 | 3,651,164 | 9.06 | 3,325,616 |
| United Kingdom | 84 | 32,885,283 | 80.67 | 34,136,025 | 79.44 | 29,106,588 |
| Germany and Austria | 4 | 1,565,966 | 5.72 | 2,420,183 | 6.95 | 2,551,252 |
| Japan | 00.5 | 195,746 | 00.24 | 102,617 | 00.18 | 68,240 |
| All other countries | 3.5 | 1,370,220 | 4.74 | 2,006,449 | 4.37 | 1,604,450 |
| | 100.00 | 39,149,147 | 100.00 | 42,316,438 | 100.00 | 36,656,146 |

## April Machinery Exports Drop

Exports of industrial machinery from the United States in April dropped more than $1,000,000 below figures of March and of the corresponding month a year ago, W. H. Rastall of the Industrial Machinery Division of the Department of Commerce states. Despite the drop, the figures for the first five months of 1928 continue well in advance of the totals for the same period in 1927, he points out. Total shipments for April were $16,225,000, the report states.

## Chesapeake & Ohio to Expand Shop Facilities

Enlarged shop facilities for the Chesapeake & Ohio Ry. which were planned for Richmond prior to the recent merger attempts of the road, now are being discussed, according to William J. Harahan, president. It is not decided that the shops will be located in Richmond. They are expected to employ between 2,000 and 3,000 men. Mr. Harahan denied that the Chesapeake & Ohio might take over the Richmond plant of the American Locomotive Company.

Table II—Imports of Industrial Machinery Into India for the Fiscal Years of 1925-26 and 1926-1927

| | 1925–1926 | | | | | 1926–1927 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Classification | United States and Canada, Rupees | United Kingdom, Rupees | Germany and Austria-Hungary, Rupees | All Other Countries, Rupees | Total, Rupees | United States and Canada, Rupees | United Kingdom, Rupees | Germany and Austria-Hungary, Rupees | All Other Countries, Rupees | Total, Rupees |
| Oil engines and parts | 288,325 | 9,975,418 | 553,641 | 636,217 | 11,453,601 | 254,300 | 10,194,447 | 529,324 | 480,792 | 11,458,863 |
| Steam engines and parts | 145,715 | 7,676,488 | 323,992 | 265,951 | 8,412,146 | 263,033 | 7,023,545 | 391,804 | 144,816 | 7,823,198 |
| Gas engines and parts | 13,275 | 576,999 | 25,175 | 10,484 | 625,933 | 58,095 | 247,309 | 2,715 | 2,740 | 310,859 |
| Other engines (not incl. locomotives) | 8,603 | 534,089 | 32,208 | 165,364 | 740,264 | 5,906 | 149,300 | 29,832 | 47,057 | 232,095 |
| Charged water machinery | 694 | 149,020 | 15,890 | 11,970 | 177,574 | 8,602 | 363,319 | 74,970 | 26,655 | 473,546 |
| Boilers | 74,943 | 8,723,224 | 623,543 | 376,042 | 9,797,752 | 42,410 | 5,914,284 | 148,397 | 170,775 | 6,275,866 |
| Boot and shoe machinery | ..... | 66,756 | 6,461 | ..... | 73,217 | ..... | 38,867 | 4,562 | ..... | 43,429 |
| Tanning machinery | 1,570 | 19,016 | 864 | 13,594 | 35,044 | 1,064 | 126,790 | 935 | 8,230 | 137,019 |
| Metal working machinery | 628,617 | 3,279,518 | 351,201 | 141,002 | 4,400,338 | 646,272 | 2,777,244 | 227,478 | 97,102 | 3,748,096 |
| Mining machinery | 4,443,130 | 5,144,407 | 736,859 | 2,152,826 | 12,477,222 | 3,033,023 | 3,747,261 | 1,552,487 | 1,464,284 | 9,797,055 |
| Oil crushing and refining machinery | 491,786 | 1,073,295 | 507,493 | 53,010 | 2,125,584 | 350,761 | 2,154,274 | 584,021 | 197,053 | 3,286,109 |
| Paper mill machinery | 2,038 | 294,726 | 35,804 | 3,461 | 336,029 | 12,083 | 626,922 | 23,560 | 6,920 | 669,485 |
| Refrigerating machinery | 502,084 | 244,478 | 48,111 | 36,834 | 831,507 | 503,799 | 524,262 | 67,239 | 75,438 | 1,170,738 |
| Rice and flour machinery | 456,469 | 841,477 | 1,029,036 | 105,297 | 2,432,279 | 372,553 | 1,075,819 | 1,204,825 | 116,410 | 2,769,607 |
| Sawmill and wood-working mach'y. | 58,597 | 607,766 | 62,816 | 95,715 | 824,894 | 138,973 | 677,443 | 10,627 | 29,247 | 856,290 |
| Sugar machinery | 63,388 | 1,231,185 | 247,563 | 54,981 | 1,597,117 | 35,068 | 555,091 | 21,489 | 9,189 | 620,837 |
| Tea machinery | ..... | 3,857,858 | ..... | 645 | 3,858,503 | ..... | 2,627,615 | ..... | 484 | 2,628,099 |
| Textile machinery (not incl. sewing and knitting machinery) | 331,140 | 31,651,156 | 577,711 | 382,488 | 32,942,495 | 286,988 | 23,969,719 | 539,032 | 360,220 | 25,155,959 |
| Miscellaneous industrial machinery | 2,470,938 | 17,371,945 | 1,437,770 | 1,259,746 | 22,540,399 | 3,158,653 | 17,478,381 | 1,622,699 | 1,375,633 | 23,635,366 |
| Totals | 9,981,312 | 93,318,821 | 6,616,138 | 5,765,627 | 115,681,898 | 9,171,583 | 80,271,892 | 7,035,996 | 4,613,045 | 101,092,516 |
| At 3,658 for 1925–26 and 3,626 for 1926–27 | $3,651,164 | $34,136,025 | $2,420,183 | $2,109,066 | $42,316,438 | $3,325,616 | $29,106,588 | $2,551,252 | 1,672,690 | $836,656,146 |

# *The Business Barometer*

## The outlook in Commerce, Finance, Agriculture and Industry

By THEODORE H. PRICE

*Editor, Commerce and Finance, New York*

*(Copyrighted, Theodore H. Price Publishing Corporation, 16 Exchange Place, New York)*

IT IS a waste of time to argue that politics should not affect business. Business *is* affected by politics. This was abundantly proved by the course of the markets last week. When it became clear that Coolidge would not be nominated nearly everything declined. Stock dropped sensationally, but most commodities also went down and the average of prices is substantially lower.

Of course it is absurd to say that prosperity will forsake the United States if either Secretary Hoover or Governor Smith becomes President; but business abhors change and the hysterical speculators who were buying stocks so merrily had persuaded themselves that the Coolidge boom and the Coolidge administration were contemporaneous and would be co-terminus.

Therefore, they commenced to sell as soon as it became apparent that their patron saint would not succeed himself and aggregate market values must have been reduced by several billion dollars during the week.

The decline can not have been much of a surprise to those who have followed the views expressed in these letters during the last few months. For some time now it has been plain that those who were buying securities at the highest prices on record had become the victims of their own enthusiasm. But they refused to heed the warnings of experience or the growing tightness of money, and it was not until their belief that Coolidge could be "drafted" proved to be an illusion that their mood changed and they commenced to realize that selling as well as buying is an essential step in every speculative operation.

Opinions differ as to whether the liquidation has been completed or not. It is self-evident that prices must finally reach a level at which those who own the securities outstanding will be content to keep them, but as long as they are being carried with borrowed money further liquidation would seem to be likely, at least until dividends equal or exceed the interest paid.

The recent readjustment in values has been made necessary by the fact that the dividends collected or collectible have not equalled the cost of money, and as long as this disparity exists it will be difficult to start the market up again or prevent a further decline. The weekly statement of brokers' loans should, therefore, be closely watched.

There are in fact some who assert that the "statis" recently manifest in the total of brokers' borrowings is partially due to the loans made against new securities that had not been readily taken by the public and that no great reduction can be expected until these securities have been digested. If this be true, a period of slow liquidation is probably ahead of us. This and the possibility that the precipitant decline in the value of certain bank shares may embarrass some of those who own these shares are about the only other features that need be considered.

Meanwhile, it is in order to point out that the decline in Stock Exchange quotations does not mean that the country is poorer or that the intrinsic value of the equities that are called shares is any less than it was. One share of stock in the United States Steel Corporation still represents an interest of approximately one-seven millionth in the net assets and earnings of that enterprise, and the same statement applies to the shares of all other corporations. Unless their assets or earnings diminish, the real value of their shares will not be reduced and the prices at which they are quoted should make no difference to those who own them, and need not sell.

The important question is, will their earnings or their assets be impaired by the recent decline in the stock market, or any further decline that may ensue? If men were machines and actuated entirely by mathematical impulses, the answer to this question would be an emphatic "No!" But humanity is emotional and as most of the ten or twenty millions who have been speculating in stocks will probably lose at least a portion of what they thought they had gained, allowance must be made for their disappointment. At first it will discourage them and a lessening of trade activity will probably follow. But the Blessed Hope that Springs Eternal will soon reassert itself, and with their minds undistracted by the ticker the business men of this country ought to surpass anything they have previously achieved. A nationwide crop failure or the paralysis of fear are the only possibilities that are likely to thwart them in attaining an objective so desirable.

The first is utterly improbable and there is no reason for fear of the future unless we allow ourselves to be persuaded that business can be injured by the political ghosts that usually stalk abroad in a presidential year.

It is chiefly a matter of confidence in ourselves. Last week's decline on the Stock Exchange was precipitated by the appearance of one of these political wraiths. Distributive trade was slowed down for the same reason and the price of commodities dropped in sympathy. Cotton, wheat, sugar, coffee, rubber, and cocoa all declined. Conventional and technical explanations of the recession were offered in the case of each market, but the real reason was an unwarranted fear of the future, which fortunately has nearly passed.

## WHAT'S DOING IN INDUSTRY

**IN BOTH Detroit and Cleveland a decided slump in machine tool buying has been noted in the early part of June, and in both centers it is expected that this dullness will extend throughout the summer. Last week also was the quietest in some time for New England manufacturers and dealers, but although inquiries were in small volume, business is expected to pick up in the near future.**

**A SLIGHT falling off in sales is also noted in Cincinnati, but the lull there is regarded as temporary. Agents about held their own and are quite optimistic, with much business pending. Machine tool business in Philadelphia is not up to expectations, and although inquiries are plentiful, the tone is not as encouraging as was the case earlier in the year. In Chicago little change has been noted for some weeks, while in New York, business in the first two weeks of the month was a decided improvement over that of the latter part of May. Incidentally, the index figures of the National Machine Tool Builders' Association showed that net orders in May slipped down somewhat from the point reached in April, but not enough to turn the 3-month trend line downward.**

**AUTOMOTIVE buying is practically at a standstill in Cleveland, but is still keeping up in Detroit. Round-lot buying from this source is practically over in Milwaukee, but replacement orders continue to come in from automobile builders. Employment in that center and in Detroit is at a high level. In fact, there is a dearth of skilled machinists. Railroad purchases are being delayed, but there is a feeling that considerable business will be forthcoming in the near future.**

# *The Industrial Review*

## Weekly progress of the machinery and machine tool business

THE following reports, gathered from the various machinery and machine tool centers of the country, indicate the trend of business in these industries and what may be expected from the future.

### PHILADELPHIA

While business in the machinery and machine tool lines has not been up to expectations during the last two weeks, producers of automobile body equipment reported a satifactory situation. Ball and roller bearing manufacturers reported an encouraging outlook, particularly from the airplane and automotive centers.

Orders have been received from engine builders for ball bearings, and during the last two or three months this line of equipment has found a somewhat substantial market in the East. Body builders in this market have not done any extensive business with aircraft producers, although one such concern reported there had been some special production in its plant along that line.

Reports reached some of the machine tool dealers that railroad companies would be in the market shortly for shop equipment, but there was nothing certain in the rumors. A few replacement orders have been received for single tools. Inquiries were quite plentiful but had a less encouraging tone than that displayed earlier in the year.

### DETROIT

The machinery and machine tool business in Detroit seems to have entered its summer period of depression. Business has fallen off considerably except in specialized fields and most of the dealers expect the slack period to continue during June, July and August.

There is always the prospect that the Ford Motor Company will enter the field with large orders, but this seems not to be generally expected. Packard is shutting down for its annual two weeks vacation and many of the other plants are planning to do the same thing.

Chevrolet and Oldsmobile are doing some buying as is Pontiac. In general, however, the business is far below the level of a month ago. It is generally predicted that the fall will be a good season, and that the year as a whole will be one the best in many years.

Employment is still increasing, although slowly and irregularly. The general prosperity of the district is excellent, and there is a fine feeling of optimism everywhere.

### CHICAGO

Little change in the machine tool market in the Chicago district has been reported within the last week. In some special lines, however, considerable activity has prevailed, notably in the sale of grinding machines and wheels, the local representative of one of the leading producers of the East stating that business is at a high peak, the automotive industry being the leading buyer. Manufacturers of motors for aircraft also report a pronounced increase in their output, which they expect will be maintained for an indefinite period. Railroad buying is only occasional, and of small volume. The Santa Fe has not thus far bought against its list for heavy-duty tools, issued several weeks ago. It is expected with some confidence that within the next two weeks this well be done. The Northern Pacific has just recently come into the market with inquiries for a number of tools, and early closing on these lists is anticipated. Among the builders of farm machinery and tractors, the J. I. Case Treshing Machine Co., Racine, Wis., the Caterpillar Tractor Co., Peoria, Ill., and Deere & Co., Moline, Ill., have issued new lists for needed shop equipment. Demand for used tools is only moderate, and compares unfavorably with that of a month ago. Several Chicago representatives of tool manufacturers have indicated their intention to attend the meeting of the American Railway Association at Atlantic City.

### CLEVELAND

Although somewhat delayed, the reaction that has been expected in the machinery and machine tool line has arrived. Business for the last fortnight showed a decided slump compared to that of the previous two weeks. The automobile industry has slowed down its buying; in fact, this business is practically at a standstill. The number of inquiries also has fallen below normal, and the usual summer dullness is expected to last until September.

Orders were mostly for single pieces from diversified lines. The Geometric Stamping Co., bought two shapers. The New York Central R.R. had a fair sized list out, but no awards have been made. Stock market fluctuations and the drop in rubber prices has been the determining factor in holding up several orders from rubber tire manufacturers in the Akron district.

Announcement of plans for new building extensions by the Federal Foundry Supply Co., the Eaton Axle Co., and the Ohio Foundry Co., has created considerable interest as all three of these projects are of considerable size and will require new tools.

### CINCINNATI

The majority of the machine tool manufacturers in the Cincinnati district report a slight falling off in the demand in the past week. The volume of buying was less than the actual needs, it is stated, and for this reason the lull is regarded as merely temporary. A few concerns held their own, and a small number made a slight gain, and hence the average falling off of sales in the week is not large enough to cause any apprehension as to the immediate future.

Selling agents report that they held their own, with neither appreciable loss nor gain. Business pending, it is thought by this branch of the trade, will very soon bring trade up to a higher level. The great obstacle at this time, it is stated, is an abnormal sales resistance, with an unexplainable tendency to postpone purchases of actual needs.

The great majority of the orders were for single tools and replacements, but here and there was an order for two or three pieces of equipment. Purchases by railroads and automobile manufacturers were also confined to single tools.

Inquiries came in freely during the week, the majority of them being in regard to single items. These were well diversified and well scattered over the country. A number of inquiries for efficiency tools came from foreign markets.

### NEW ENGLAND

The past week, generally speaking, was the quietest experienced in some time in the New England machinery market. Inquiry has been light and interest in buying dropped accordingly. Orders placed embraced for the most part single items, and no outstanding buyer was represented. A favorable factor in the New England situation, however, is seen in the prospective demand for machine shop equipment.

Officials of Fall River, Mass., received bids for machine shop equipment to be used for educational purposes. New Bedford, Mass., is expected to ask for figures shortly for machine shop and electrical shop equipment in connection with a vocational school. A machine shop is included in the construction of an airport now underway at East Agawam, Mass., for which tools are required.

The Waterbury Foundry & Machine Co., Waterbury, Conn., is asking bids for a 2-story addition to contain 40,000 sq.ft. of floor space. The Underwood-Elliott Fisher Co., Hartford, Conn., has awarded contract for a $300,000 power unit to include automatic stoking and conveying equipment.

Sales reported from the used machine tool and machinery field were confined largely to grinding tools, presses, automatic screw machines, small lathes and drills. A New Britain machine company purchased a new Hendey lathe and a New Haven concern a squaring shears.

### MILWAUKEE

Comment concerning business in metalworking equipment, generally speaking, is of a conservatively optimistic character. In some quarters there is talk of dullness, but in many other instances shops are working virtually at capacity to meet delivery specifications. Employment in the machine tool industry is still keeping at the recent high point, and employers say that it is difficult to procure skilled machinists as needed. The labor market, so far as other divisions of the machine shop industry is concerned, is in excellent conditions as regards the absorption of the supply. The reopening of the Milwaukee Ford plant in the middle of June gave employment to 400 men and gradual additions are being made to bring the payroll up to 600 by the first of July.

It is believed that most of the round-lot requirements of automobile factories have been filled for the present, but tool builders will profit for several months longer in putting the orders through the shop. Every day witnesses the receipt of orders from automobile factories for machines for replacement, however, with rush shipment requested.

General inquiry is holding up well and makes the outlook for a continuance of moderate buying activity promising. Manufacturers of power farm machinery, highway and general construction equipment, are experiencing active business and are good customers of tool plants. There is a fair demand also from makers of paper mill and woodworking machinery, especially in Wisconsin.

### NEW YORK

There is every indication that machine tool business in June in the New York territory will exceed that of May for nearly all dealers and factory representatives. On the average orders in the past two weeks have been plentiful, with few exceptions, and the same spirit of optimism that has prevailed for some months is still in evidence. Much business is pending and inquiries are coming in freely. The expected seasonal dullness has not yet materialized. Rumors of big orders continue to circulate, but the market is still characterized by orders for one or two tools.

The Wright Aeronautical Corporation, long a factor in this market, is showing signs of even greater activity, so that Paterson is now the Mecca for many ma-

chine tool salesmen. In the past week, one Warner & Swasey lathe and two Edlund drills were sold there among others. The General Electric Co. also continues to attract attention with long lists, but few orders have been placed of late. Most of the needed equipment is for production of the household refrigerator.

Among other machine tools sold in this territory in the past week were one Star lathe, an Oesterlein miller, ten centerless grinders, six Lodge & Shipley lathes, several Monarch lathes and a miscellaneous amount of small equipment. Machines sold by the Pratt & Whitney Co. for shipment outside this territory included three bench millers, four surface grinders, six toolroom lathes, three automatic lathes, a diesinker, two jig borers, and four Sigourney drills. The Niles Tool Works Co. sold one 30-in. x 28-ft. Timesaver lathe, and five Ransom grinders, the last to a railroad in the West. Cranes sold by Niles in the past fortnight included: one 10-ton x 48-ft.; one 20-ton x 94-ft.; four 5-ton x 100-ft.; one 10-ton x 67-ft.; one 30-ton x 48-ft.; and seven 5-ton x 58-ft. Three of these cranes went to railroads.

### BUFFALO

Reports from Buffalo machine tool dealers for the first two weeks in June indicate a slight falling off in business over the rather bumper business of May. This was not noticeable during the first week in June, but began to be seen in the second week, some dealers feeling it more than others.

Only one or two dealers reported a business thus far as good as that of May and those reported that most of the shipments were on orders that had been pending for some time. No big contracts have been reported.

In the electrical equipment field activity has been fairly good on a large volume of small orders. There are some indications that industrial executives are buying in anticipation of the summer season. In the contractors' equipment field, business continues good, but the price situation is far from satisfactory to dealers.

## World Engineering Congress Plans Progressing

The scope of the World Engineering Congress, to be held in Tokyo, Japan, in October, 1929, is indicated in the technical program just released. No titles of papers, nor authors' names are given at this time. This preliminary announcement merely lists the subjects to be discussed under 23 divisions as follows: General problems concerning engineering; engineering science, including strength of materials and electricity; precision machines and instruments; architecture and structural engineering; public works; railway engineering; transportation; communication; power; electrical engineering; illuminating engineering; mechanical engineering, including machinery, machine tools and machines for manufacturing, machines for conveyance, mechanism and machine design; refrigerating industry; textile industry; shipbuilding and marine engineering, including equipments of shipbuilding yards; aeronautical engineering; automotive engineering; chemical industry; fuel and combustion engineering; mining and metallurgy; engineering materials; scientific management; and miscellaneous.

Regulations covering the congress have also been released. The official languages are to be English and Japanese. Papers must not exceed 8,000 words in length, but no restriction is placed upon the number of papers submitted by a single author. An abstract in English is to accompany each paper. Sessions will be divided into plenary and sectional. At the former, discussions and reports on matters of importance will be heard. S. Yoshino, Nihon Kogyo Club, Marunouchi, Tokyo, is general secretary.

A nationwide movement to marshal a large delegation of engineers from the United States to attend the Congress is now under way, it was announced recently by Maurice Holland, executive director of the American Committee, which is arranging for American participation in the international gathering. It is reported that engineers and engineering societies in the United States will be organized into units to cooperate in an effort to interest the engineering profession in the Congress in order that the United States will be represented at the meeting by a large delegation. Dr. Elmer A. Sperry is chairman of the American Committee which will bring a delegation to Tokyo in October of 1929 and Herbert Hoover is honorary chairman of the Committee.

The special committee on promotion and attendance has appointed Ernest Hartford, of New York, assistant secretary of the American Society of Mechanical Engineers, as its secretary. Mr. Hartford was authorized to organize local co-operative committees throughout the United States which would include the local sections of the founder Engineering Societies as well as independent local engineering clubs and societies. William E. Wickenden was authorized to communicate with the presidents of engineering colleges requesting their endorsement and active participation in a plan to send members of their faculties to the congress.

The members of the Committee on Promotion and Attendance which is striving for a large attendance from the United States, are: Edward Dean Adams, J. J. Carty, Howard E. Coffin, Gano Dunn, George W. Fuller, Chairman; Bancroft Gherardi, John Hays Hammond, Charles H. Herty, Samuel Insull, Arthur D. Little, William Benson Mayo, Charles D. Marx, William C. Potter, E. Wilbur Rice, Jr., Charles M. Schwab, George Otis Smith, John F. Stevens, S. W. Stratton, Ambrose Swasey, Samuel M. Vauclain, H. H. Westinghouse and William E. Wickenden.

## Senate Orders Investigation of Unemployment

The Senate, just before adjournment, passed a bill requiring the committee on education and labor of the Senate, or a duly authorized sub-committee thereof, to make an investigation concerning the causes of unemployment and the relation to its relief. The investigation will cover (a) the continuous collection and interpretation of adequate statistics of employment and unemployment; (b) the organization and extension of systems of public employment agencies, both Federal and state; (c) the establishment of systems of unemployment insurance or other unemployment reserve funds, Federal, state or private; (d) the curtailment of production, consolidation, and economic reconstruction; (e) the planning of public works with regard to stabilization of employment; and (f) the feasibility of co-operation with the Federal, state and private agencies with reference to (a), (b), (c) and (e). The report of the committee is to be made to the Senate, together with recommendations for legislation if such is deemed advisable, on or before Feb. 15, 1929.

## A.E.S.C. Year Book Records Standardization Progress

Important standardization activities in many American industries during the past twelve months are described in the Year Book of the American Engineering Standards Committee, issued recently. Forty-nine new standards and 40 new projects are listed for numerous branches of industry and engineering, including mechanical, civil, electrical, mining, wood, textiles and safety.

The discovery or the development of the best processes and practices possible with present-day knowledge, and the extension of these, as standards, to all branches of industry is cited in the Year Book as the object of the standardization movement. The A.E.S.C. has adopted 111 national standards up to the present time and is now working on 164 other standardization projects, according to the Year Book. Continual contact is maintained by the committee with the nineteen national standardizing bodies in foreign countries with the constant exchange of standards and specifications.

The completion of three standards for bolts and rivets marks an advance in the effort to bring about nationwide interchangeability of small mechanical parts. The new code for the design of transmission shafting is valuable as a technical basis for the work of machine designers.

Broad revision of the rules of procedure of the American Engineering Standards Committee to keep pace with increasing demands for national standardization activities has been one of the important accomplishments of the past year.

Copies of the Year Book may be obtained on request to the American Engineering Standards Committee, 29 West 39th St., New York.

## Obituaries

BASIL MILES, who has been American administrative commissioner to the International Chamber of Commerce in Paris since 1922, died on June 14 in Washington.

W. R. DORSEY, for the past five years Pittsburgh representative of the United States Electrical Tool Co., died June 8 at the age of 53. He had been with the company for many years.

R. R. CUTHBERTSON, formerly manager of the Chicago office of Manning, Maxwell & Moore, Inc., and later with the Stocker, Rumley, Wachs Co., machine tool dealer in Chicago, died recently.

NORMAN A. ROBERTSON, president of the John Robertson Co., of Brooklyn, N. Y., died recently after a short illness. Mr. Robertson was well known in the metal-working industry and developed and built much special machinery.

PAUL R. CHUBBUCK, founder of the Streator Metal Stampings Co., of Streator, Ill., died on May 29 of heart disease. He left an estate of about $500,000. He was identified with the old Hallady Automobile Co., which failed 15 years ago.

GUSTAV H. KOVEN, president of L. O. Koven & Bros., Inc., boiler manufacturers, of Jersey City, N. J., died on June 13 at the age of 55. He was also president of the International Overseas Corporation, of New York, and an officer in several banks and other corporations. Mr. Koven was an active civic worker.

CHARLES C. ELY, president and treasurer of the Trimount Manufacturing Co., Roxbury, Mass., manufacturers of wrenches, died June 5 in Boston. Mr. Ely was 91 years old. His brother organized the Trimount company in 1888 and Mr. Ely took over the business in 1902 at the death of his brother. He was a noted philanthropist and was a poet of some prominence.

EDMUND D. GARFIELD, for twenty-four years with Manning, Maxwell & Moore, Inc., died of pneumonia, June 5, at St. Paul, Minn., at the age of 55. For some years he was manager of this company's Milwaukee branch office. Later, the Milwaukee office was consolidated with the Chicago office of the company, and since that time Mr. Garfield acted as special railroad representative, with headquarters in Chicago.

## Personals

C. E. LEX, JR., has joined the Cincinnati Shaper Co., of Cincinnati, as sales engineer.

G. F. CADY has been appointed shop superintendent of the Horton Steel Works at Bridgeburg, Ontario.

HENRY DRESES, president of the Dreses Machine Tool Co., Cincinnati, has left for a four-month tour of European countries.

CHARLES A. TERRY, vice-president of the Westinghouse Electric & Manufacturing Co., has been elected a director to succeed the late Guy E. Tripp.

L. W. SIMMS, of St. John, New Brunswick, was elected president of the Canadian Manufacturers' Association at the annual meeting held June 7, in Quebec City.

GEORGE E. RANDLES, president of the Foote-Burt Co., Cleveland, machine tool manufacturer, sailed for Europe, where he will spend two months in France, Germany and England, largely on business.

SCOTT H. SIMON has been elected president of the Caryle Johnson Machine Co., Manchester, Conn. For the past three years he was vice-president; previous to that he served as treasurer for twenty years.

HUNTINGTON B. CROUSE, president of the Crouse Hinds Co., Syracuse, N. Y., was elected president of the National Electrical Manufacturers' Association in annual convention at Hot Springs, Va., June 12.

CHARLES F. SCHERER, machine shop superintendent of the Davenport Machine & Foundry Co., Davenport, Iowa, and for 18 years an employee of the company, has been advanced to general manager of the plant.

NORMAN F. ROBERTSON has been elected president of the John Robertson Co., Inc., of Brooklyn, to succeed his father, the late Norman A. Robertson. Allan R. Hardie, treasurer of the company, has been made secretary-treasurer.

KENNETH T. DAWES was elected chairman of the board of directors of William Hamilton, Limited, Canadian manufacturers of engineering equipment and machinery. Col John H. Price, of Price Bros. and Co., Ltd., was elected a member of the board.

J. WOHLFELD, production engineer, has been appointed exclusive representative of the Siewek Tool & Die Co., of Detroit. The Universal Standards Co., of Detroit, also has appointed him distributor of its products with offices of J. Wohlfeld Tool Design & Sales Co., 10229 Woodward Ave., Detroit.

CHARLES B. HARTER, general superintendent of the Fordson Plant of the Ford Motor Co., has resigned. Up until two years ago, he had been superintendent of the Highland Park plant since its completion. He had been with the company 24 years.

DWIGHT C. DANIELS is production manager of the machine division and Hugo W. Beth has been made production manager of the wheel division of the Norton Co., Worcester, Mass. The following changes have been made in the wheel sales division organization: Ralph M. Johnson, district manager at Hartford, made district manager at Philadelphia; W. Earle Shumway made manager of the Connecticut division; and H. K. Clark of the Chicago office, made sales manager of the Deutche Norton Gesellschaft, the company's German subsidiary.

## Business Items

The Au Fait Engineering Co., 348 Milwaukee St., Milwaukee, doing a general machine shop business, has announced dissolution of the partnership, effective June 10. The unfinished business and affairs of the firm will be attended to by Philip Kinzfogl and John Streicher.

Gears and Forgings, Inc., of Cleveland, Ohio, manufacturers of gears, forgings, speed reducers and special machinery, have appointed Potter & Dugan, Inc., Erie County Bank Bldg., Buffalo, N. Y., as district representatives for Buffalo and vicinity.

The Medley Manufacturing Co., was recently formed at Columbus, Ga., with Clarence R. Medley as president, to succeed the Tom Huston Manufacturing Co. The company operates a foundry and machine shop at Columbus, manufacturing saws, stump pullers, plows and log skidders.

Dealers recently added to the list of the South Bend Lathe Works, of South Bend, Ind., are: Hardware & Supply Co., 535 S. High St., Akron, Ohio; Iowa Machinery & Supply Co., 317 Court Ave., Des Moines, Iowa; Somers, Fitler & Todd, 329 Water St., Pittsburgh, Pa., and Clark Machinery Co., 1235 St. Clair Ave., Cleveland, Ohio.

George L. Phillips & Co., Nashville, Tenn., manufacturers of power machinery, moved this month into a new plant at 122 Fifteenth Ave., South, the new plant giving the company an increased capacity compared with that of the plant at 522 Broadway where the firm has been located for the past fourteen years.

The Briggs & Stratton Corporation, Milwaukee, manufacturer of automotive electrical devices, has acquired all of the common stock of the Evinrude Motor Co., Milwaukee, maker of outboard engines. The respective plants will be continued in operation with the same management as heretofore.

The Beloit Pattern Works, Beloit, Wis., has acquired a building at 1350 Burnham St., Milwaukee, and is establishing a branch plant to facilitate production and delivery of patterns to its customers in the metal-working and woodworking industries of Milwaukee and vicinity. About 70 men will be employed at the start. H. W. Price has been appointed manager of the new shop.

Consolidation of six companies engaged in the manufacture of oxygen, hydrogen and acetylene has been effected by the organization of the Compressed Industrial Gases, Inc. The companies consolidating are the Burdett Oxygen & Hydrogen companies of Pittsburgh, Chicago, Detroit, Texas, Chattanooga and Oklahoma. Distribution is not affected.

The Manning Abrasive Co., Inc., of Troy, N. Y., and Herman Behr and Co., of Brooklyn, N. Y., have consolidated under the name of the Behr-Manning Corporation. The merged firms will continue to manufacture sandpaper and general coated abrasive products, and no immediate changes are contemplated in the manufacturing or sales policies. Both factories will be continued in operation.

The Kearney & Trecker Corporation, Milwaukee, Wis., celebrated its thirtieth anniversary on June 2. The firm was formed by Edward J. Kearney and Theodore Trecker in May, 1898, contingent upon Admiral Dewey winning the battle of Manila Bay. Both partners were in the employ of the Kempsmith Manufacturing Co. at the time, and when news of the victory came, resigned and formed their own firm.

The Highway Trailer Co., Edgerton, Wis., and its subsidiary, the Continental Axle Co., also of Edgerton, manufacturing axles for the parent concern, have been consolidated under the name of the former company. The new capital structure is $1,000,000. James W. Menhall continues as president of the Highway company. Enlargement of the works has been going on for several months.

Negotiations for the merging of the Wettlaufer Machinery Co. of Toronto, Ontario, and the L. and P. Manufacturing Co. of Niagara Falls have been successfully completed, and both industries will be moved to Hamilton, Ontario, to operate under the name of the Canadian General Machineries Co. The officers are: W. J. Southam, of Hamilton, president; W. L. Bombard, of Niagara Falls, vice-president and general manager; C. S. Watson, treasurer; J. L. and E. L. Wettlaufer, F. Leslie and S. B. Nelson, Jr., directors.

The Northwestern Malleable Iron Co., 756 Park St., Milwaukee, one of the earliest foundries in the Northwest, has sold its plant to the International Harvester Co., whose Milwaukee works adjoin the foundry. It is understood that the Northwestern company is merging its interests with a malleable casting company at Rockford, Ill., and will move its production equipment to that city. It is expected that the International company will replace the Northwestern foundry buildings with an additional production unit for tractors and cream separators, the principal output.

## Forthcoming Meetings

**American Railway Association.** Schedule of sectional meetings: Division V, mechanical, June 20 to 27, Atlantic City, N. J.; Division VI, Purchases and Stores, June 20 to 22, Atlantic City, N. J.; Division VII, Electrical, Sept. 22 to 28, Cleveland, Ohio. J. W. Welsh, secretary, 292 Madison Avenue, New York City.

**Association of Iron and Steel Electrical Engineers.** Annual meeting, Stevens Hotel, Chicago, June 25 to 29. J. F. Kelly, managing director, Empire Bldg., Pittsburgh, Pa.

**American Society for Testing Materials.** Annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J., June 25 to 29. C. L. Warwick, secretary, 1315 Spruce St., Philadelphia, Pa.

**Society of Automotive Engineers.** 1928 Summer Meeting, Chateau Frontenac, Quebec, Canada, June 26 to 29. C. E. Heywood, in charge of meetings, 29 West 39th St., New York.

**Canada's Steel and Power Show.** Second annual show to be held at the University of Toronto Arena, Sept. 4-7. Secretary, Campbell Bradshaw, 24 Front St., Toronto, Ontario.

**American Railway Tool Foremen's Association.** Annual meeting, Hotel Sherman, Chicago, Sept. 12, 13 and 14. G. G. Macina, secretary, 11402 Calumet Ave., Chicago.

**American Railway Tool Foreman's Association.** Sixteenth annual convention of the Supply Association, Hotel Sherman, Chicago, Sept. 12, 13 and 14. F. A. Armstrong, secretary, the Pratt & Whitney Co., 564 W. Monroe St., Chicago.

**National Safety Council.** Seventeenth annual safety congress will be held in New York, October 1-5. Idabelle Stevenson, executive secretary, 1 Park Ave., New York.

**American Society for Steel Treating.** "National Metals Exposition," Commercial Museum, Philadelphia, Pa., week of Oct. 8. W. H. Eisenman, secretary, 4600 Prospect Ave., Cleveland, Ohio.

**American Gear Manufacturers Association.** Semi-annual meeting, Statler Hotel, Buffalo, N. Y., Oct. 11-13. T. W. Owen, secretary, 3608 Euclid Ave., Cleveland, Ohio.

# The Weekly Price Guide

### *Rise and Fall of the Market*

THE present trend of pig-iron prices is downward; this is also true of quotations on iron and steel scrap and semi-finished steel. Finished steel prices, however, remain unaffected by the present weakness in raw materials. Pig-iron quotations are at lowest levels reached in thirteen years. The principal hot-rolled steel products hold at $1.85 per 100 lb., f.o.b., Pittsburgh, in large mill lots. Steel sheets appear to be particularly slow; blue-annealed dropped 10c. per 100 lb. during the week at Pittsburgh mills. Japanese washed wiping cloths and linseed oil are also down. The principal price advances of the week occurred in fabricated brass and copper, scrap brass and copper, and zinc sheets.

(*All prices as of June 15, 1928*)

## IRON AND STEEL

**PIG IRON**—Per gross ton, f.o.b.:

| | |
|---|---|
| CINCINNATI | |
| No. 2 Southern | $21.44 |
| Northern Basic | 20.89 |
| Southern Ohio No. 2 | 21.19 |
| NEW YORK—Tidewater Delivery | |
| Southern No. 2 (silicon 2.25@2.75) | 25.62 |
| BIRMINGHAM | |
| No. 2 Foundry | 16.00 |
| PHILADELPHIA | |
| Eastern Pa., No. 2x (silicon 2.25@2.75) | 21.76 |
| Virginia No. 2 | 27.17 |
| Basic | 21.26 |
| CHICAGO | |
| No. 2 Foundry local (silicon 1.75@2.25) | 20.00 |
| No. 2 Foundry, Southern (silicon 2.25@2.75) | 22.80 |
| PITTSBURGH, including freight charge ($1.76) from Valley: | |
| No. 2 Foundry | 20.26 |
| Basic | 19.26 |
| Bessemer | 21.26 |

**IRON MACHINERY CASTINGS**—Cost in cents per lb. o 100 flywheels, 6-in. face x 24-in. dia., hub not cored, good quality gray iron, weight 275 lb.:

| | |
|---|---|
| Detroit | |
| Cleveland | 5.00 |
| Cincinnati | 4.30 |
| New York | 5.25 |
| Chicago | 4.50@4.75 |

**SHEETS**—Quotations are in cents per pound in various cities from warehouse; also the mill base in large lots.

| Blue Annealed | Pittsburgh Mill Base | Chicago | Cleveland | New York |
|---|---|---|---|---|
| No. 10 | 2.00@2.10 | 3.50 | 3.25 | 3.90* |
| No. 12 | 2.05@2.15 | 3.55 | 3.30 | 3.95* |
| No. 14 | 2.15@2.20 | 3.60 | 3.35 | 4.00* |
| No. 16 | 2.25@2.30 | 3.70 | 3.45 | 4.10* |
| Black | | | | |
| Nos. 18 to 20 | 2.70@2.80 | 3.75 | 3.55 | 4.00 |
| No. 22 | 2.85@2.95 | 3.90 | 3.70 | 4.15 |
| No. 24 | 2.90@3.00 | 3.95 | 3.75 | 4.20 |
| No. 26 | 3.00@3.10 | 4.05 | 3.85 | 4.30 |
| No. 28 | 3.15@3.25 | 4.20 | 4.00 | 4.45 |
| Galvanized | | | | |
| No. 10 | 2.90@2.95 | 4.10 | 3.80 | 4.25 |
| Nos. 12 to 14 | 3.00@3.05 | 4.20 | 3.90 | 4.35 |
| No. 16 | 3.10@3.15 | 4.30 | 4.00 | 4.45 |
| No. 18 | 3.25@3.30 | 4.45 | 4.15 | 4.60 |
| No. 20 | 3.40@3.45 | 4.60 | 4.35 | 4.75 |
| No. 22 | 3.45@3.50 | 4.65 | 4.40 | 4.80 |
| No. 24 | 3.60@3.65 | 4.80 | 4.50 | 4.95 |
| No. 26 | 3.85@3.90 | 5.05 | 4.75 | 5.20 |
| No. 28 | 4.10@4.15 | 5.30 | 5.00 | 5.45 |

*250 to 3,999 lb.

**WELDED STEEL PIPE**—Warehouse discounts are as follows:

| | New York Black | New York Galv. | Cleveland Black | Cleveland Galv. | Chicago Black | Chicago Galv. |
|---|---|---|---|---|---|---|
| 1 to 3 in., steel, butt welded | 53% | 39% | 55½% | 43½% | 54% | 41% |
| 2½ to 6 in., steel, lap welded | 48% | 35% | 53½% | 40½% | 51% | 38% |

WROUGHT-STEEL PIPE LIST

| Size, Inches | List Price per Foot | Diameter in Inches—External | Diameter in Inches—Internal | Thickness Inches |
|---|---|---|---|---|
| 1 | $0.17 | 1.315 | 1.049 | .133 |
| 1¼ | .23 | 1.66 | 1.38 | .14 |
| 1½ | .27½ | 1.9 | 1.61 | .145 |
| 2 | .37 | 2.375 | 2.067 | .154 |
| 2½ | .58½ | 2.875 | 2.469 | .203 |
| 3 | .76½ | 3.5 | 3.068 | .216 |
| 3½ | .92 | 4.0 | 3.548 | .226 |
| 4 | 1.09 | 4.5 | 4.026 | .237 |
| 4½ | 1.27 | 5.0 | 4.506 | .247 |
| 5 | 1.48 | 5.563 | 5.047 | .258 |
| 6 | 1.92 | 6.625 | 6.065 | .28 |

**SEAMLESS STEEL TUBING**—Following net prices are for seamless mechanical tubing, cold drawn, round, .10 to .30 carbon, at New York warehouse in lots of less than 100 ft. or 100 lb.:

| Thickness—Decimal | Thickness—B.w.g. and Fractions | Outside Diameter in Inches—⅛ | ¼ | ⅜ | ½ | ¾ | 1 | 1¼ | 1½ |
|---|---|---|---|---|---|---|---|---|---|
| | | Price per Foot | | | | | | | |
| .035″ | 20 | $0.15 | $0.16 | $0.17 | $0.18 | $0.19 | $0.21 | $0.23 | |
| .049″ | 18 | .17 | .18 | .19 | .20 | .21 | .23 | .25 | |
| .065″ | 16 | .19 | .20 | .21 | .22 | .23 | .25 | .27 | |
| .083″ | 14 | .20 | .22 | .23 | .24 | .25 | .27 | .29 | |
| .095″ | 13 | .21 | .23 | .25 | .26 | .27 | .29 | .31 | |
| .109″ | 12 | .22 | .24 | .26 | .27 | .28 | .30 | .32 | |
| .120″ or .125″ | 11 | .23 | .25 | .27 | .28 | .29 | .31 | .33 | |
| .134″ | 10 | .24 | .26 | .28 | .29 | .30 | .32 | .34 | |

**MISCELLANEOUS**—Warehouse base prices in cents per lb.:

| | New York | Cleveland | Chicago |
|---|---|---|---|
| Spring steel, light* | 4.50 | 4.65 | 4.65 |
| Spring steel, heavier | 4.00 | 4.00 | 4.00 |
| Coppered Bessemer rods | 6.05 | 6.00 | 6.20 |
| Hoop steel | 4.50‡ | 4.00 | 4.15 |
| Cold rolled strip steel | 6.25 | 6.00 | 6.10 |
| Floor plates | 5.10‡ | 5.30 | 5.00 |
| Cold drawn, round or hexagon† | 3.40 | 3.65 | 3.60 |
| Cold drawn, flat or square† | 3.90 | 4.15 | 4.10 |
| Structural shapes | 3.30‡ | 3.00 | 3.10 |
| Soft steel bars | 3.25‡ | 3.00 | 3.00 |
| Soft steel bar shapes | 3.25‡ | 3.00 | 3.00 |
| Soft steel bands | 4.00‡ | 3.65 | 3.65 |
| Tank plates | 3.30‡ | 3.00 | 3.10 |
| Bar iron (2.75 at mill) | 3.24 | 3.00 | 3.00 |
| Drill rod (from list) | 60% | 55% | 50% |

*Flat, 3/16@½-in. thick. †Cold finished steel, shafting and screw stock. ‡250 to 3,999 lb., ordered and released for shipment at one time.

Electric welding wire, New York, 3/32, 8.35c.; ⅛, 7.85c.; 5/32 to ½ 7.35c. per lb.

## METALS

Warehouse Prices in Cents Per Pound for Small Lots:

| | | | |
|---|---|---|---|
| Copper, electrolytic, New York | | | 15.50 |
| Tin, straits, pigs, New York | | | 53.00 |
| Lead, pigs, E. St. Louis | 6.15 | New York | 7.75 |
| Zinc, slabs, E. St. Louis | 6.15 | New York | 7.75 |

| | New York | Cleveland | Chicago |
|---|---|---|---|
| Antimony, slabs | 13.00 | 13.00 | 14.25 |
| Copper sheets, base | 23.50 | 23.50 | 23.25 |
| Copper wire, base | 20.12½ | 19.62½ | 16.75* |
| Copper bars, base | 22.00 | 22.00 | 22.25 |
| Copper tubing, base | 25.00 | 25.00 | 24.75 |
| Brass sheets, high, base | 19.25 | 19.25 | 19.00 |
| Brass tubing, high, base | 24.12½ | 24.12½ | 23.87½ |
| Brass rods, high, base | 17.00 | 17.00 | 16.75 |
| Brass wire, high, base | 19.75 | 19.75 | 19.50 |

*At mill

# Shop Materials and Supplies

## METALS—Continued

| | New York | Cleveland | Chicago |
|---|---|---|---|
| Aluminum ingots, 99%..... | 25.00* | 22¾@24 | 24.30 |
| Zinc sheets (casks)..... | 9½@10 | 11.00 | 9.36 |
| Solder (strictly)..... | 32.75 | 32.50 | 31@34 |
| Babbitt metal, delivered, New York, cents per lb.: | | | |
| Genuine, highest grade..... | | | 68.50 |
| Commercial genuine, intermediate grade..... | | | 53.00 |
| Anti-friction metal, general service..... | | | 31.50 |
| No. 4 babbitt (f.o.b.)..... | | | 12.25 |
| Nickel, f.o.b. refinery, Bayonne, N. J., cents per lb.: | | | |
| Ingots..... 35.00 | Electrolytic.. 37.00 | Shot..... | 36.00 |

*Delivered.

**SPECIAL NICKEL AND ALLOYS**—Price in cents per lb., f.o.b. Huntington, W. Va.:

| | |
|---|---|
| Full finished nickel sheet (base)..... | 52.00 |
| Cold rolled nickel sheet (base)..... | 60.00 |
| Hot rolled rods, Grade "A" (base)..... | 45.00 |
| Cold drawn rods, Grade "A" (base)..... | 53.00 |

Base price of Monel metal in cents per lb., f.o.b. Huntington, W. Va.:

| | | | |
|---|---|---|---|
| Shot..... | 28.00 | Hot rolled rods (base)... | 35.00 |
| Blocks..... | 28.00 | Cold drawn rods (base).. | 43.00 |
| Cold rolled sheets (base) | 50.00 | Full finished sheets (base) | 42.00 |

**OLD METALS**—Dealers' purchasing prices in cents per pound, f. o. b. cars, depending on quantity:

| | New York | Cleveland | Chicago |
|---|---|---|---|
| Crucible copper..... | 13.00 @13.25 | 12.00 | 11.75@12.25 |
| Copper, heavy, and wire.. | 10.75 @12.87½ | 11.25 | 11.25@11.75 |
| Copper, light, and bottoms | 10.75 @11.25 | 9.75 | 10.00@10.50 |
| Heavy lead..... | 5.25 @ 5.50 | 5.25 | 4.50@ 5.00 |
| Tea lead..... | 4.00 @ 4.25 | 3.75 | 3.50@ 4.00 |
| Brass, heavy, yellow..... | 7.25 @ 7.50 | 7.75 | 7.25@ 7.75 |
| Brass, heavy, red..... | 9.75 @10.25 | 10.00 | 9.50@ 9.75 |
| Brass, light..... | 5.87½@ 6.12½ | 6.25 | 6.25@ 6.75 |
| No. 1 yellow rod turnings. | 7.75 @ 8.25 | 7.75 | 7.50@ 8.00 |
| Zinc..... | 3.25 @ 3.50 | 3.25 | 2.87½@3.37½ |

**TIN PLATES**—Charcoal—Bright—Per box.

| | | New York | Cleveland | Chicago |
|---|---|---|---|---|
| "AAA" Grade: | | | | |
| IC, | 14x20..... | $12.10 | $11.95 | $11.50 |
| "A" Grade: | | | | |
| IC, | 14x20..... | 9.70 | 9.90 | 9.50 |
| | Coke Plates—Primes—Per box | | | |
| 100-lb., | 14x20..... | 6.45 | 6.10 | 7.00 |
| | Terne Plates—8-lb. Coating—Small lots—Per box | | | |
| IC, | 14x20..... | 7.75@8.00 | 7.00 | 7.50 |

## MISCELLANEOUS

| | New York | Cleveland | Chicago |
|---|---|---|---|
| Cotton waste, white, per lb.* | $0.10@0.13½ | $0.16 | $0.15 |
| Cotton waste, colored, per lb.* | .09@ .13 | .12 | .12 |
| Wiping cloths, washed white, per lb..... | .15@.17½ | 38.00 per M | .17 |
| Sal soda, per lb..... | .02 | .02 | .02¾ |
| Roll sulphur, per lb..... | .027 | .03½ | .04 |
| Linseed oil, raw, per lb. in 1 to 4 bbl. lots..... | .11 | .105 | .107 |
| Cutting oil, about 25% lard, in 5 gal. cans, per gal.... | .65 | .60 | .60 |
| Machine oil, medium-bodied (55 gal. steel bbl.) per gal..... | .30 | .36 | .36 |
| Belting—Present discounts from list in fair quantities (¼ doz. rolls). | | | |
| Leather—List price, 24c. per lin.ft. per inch of width for single ply. | | | |
| Medium grade..... | 31½% | 35% | 35% |
| Heavy grade..... | 27% | 30% | 30% |
| Rubber transmission, 6-in., 6 ply, $1.83 per lin.ft. | | | |
| First grade..... | 45% | 50–10% | 50% |
| Second grade..... | 50% | 60–5% | 50–10% |

*All waste in bale lots.

## *Comparative Warehouse Prices*

| New York | Unit | Current Price | Four Weeks Ago | One Year Ago |
|---|---|---|---|---|
| Soft steel bars..... | per lb..... | $0.0325 | $0.0325 | $0.0324 |
| Cold drawn shafting.... | per lb..... | .034 | .034 | .04 |
| Brass rods..... | per lb..... | .17 | .1675 | .155 |
| Solder (½ and ½)..... | per lb..... | .3275 | .3375 | .41 |
| Cotton waste, white.... | per lb..... | .10@.13½ | .10@.13½ | .10@.13½ |
| Emery disks, cloth, No. 1, 6-in. dia..... | per 100... | 3.10 | 3.10 | 3.10 |
| Lard cutting oil..... | per gal... | .65 | .65 | .65 |
| Machine oil..... | per gal... | .30 | .30 | .33 |
| Belting, leather, medium..... | off list.... | 31½% | 35% | 40–5% |
| Machine bolts, up to 1x30 in., full kegs.... | off list.... | 50%* | 50%* | 50%* |

*List prices as of April 1, 1927.

## MISCELLANEOUS—Continued

| | New York | Cleveland | Chicago |
|---|---|---|---|
| Abrasive materials—Standard grade, in sheets 9x11 in., No. 1, per ream of 480 sheets: | | | |
| *Flint paper..... | $5.40 | $4.95 | $5.13 |
| *Emery paper..... | 10.71 | 9.15 | 10.71 |
| †Emery cloth..... | 27.84 | 27.85 | 27.84 |
| Emery disks, 6 in. dia., No. 1, per 100: | | | |
| Paper..... | 1.29 | 1.27 | 1.32 |
| Cloth..... | 3.10 | 3.05 | 3.05 |
| Fire clay, per 100 lb. bag..... | 1.00 | .75 | .75 |
| Coke, prompt furnace, per net ton... | Connellsville, | | 2.25@2.50 |
| Coke, prompt foundry, per net ton... | Connellsville, | | 3.25@3.75 |
| White lead, dry or in oil... | 100 lb. kegs.... | New York, | 13.25 |
| Red lead, dry..... | 100 lb. kegs.... | New York, | 13.25 |
| Red lead, in oil..... | 100 lb. kegs.... | New York, | 14.75 |

*4¼ reams and under. †Less than 2 reams.

## SHOP SUPPLIES

Discounts from new list dated Apr. 1, 1927, applying on immediate deliveries from warehouse stocks in New York and vicinity:

| | Full Kegs or Cases |
|---|---|
| Machine bolts, square heads and nuts: | |
| Up to ¾ x 6-in..... | 55% |
| Larger up to 1 x 30-in..... | 50% |
| 1⅛ and 1¼ in. dia..... | 35% |
| Carriage bolts: | |
| Up to ½ x 6-in..... | 55% |
| Larger sizes..... | 50% |
| Coach and lag screws: | |
| Up to ½ x 6-in..... | 55% |
| Larger sizes..... | 50% |
| Tap bolts, hexagonal heads..... | 40% |
| Nuts: | |
| Hot pressed, square and hexagonal, blank or tapped, up to 1-in., incl..... | 55% |
| Cold punched, square and hexagonal, blank or tapped, up to 1-in. incl..... | 55% |
| Semi-finished, hexagonal, tapped, in packages, all sizes..... | 40% |
| Case hardened, hexagonal, tapped, in packages, all sizes..... | 30% |
| Washers: Deduct from list, per 100 lb..... | $3.50* |
| Rivets, button and cone head: | |
| Small, including 7/16-in. dia..... | 50–10% |
| Large (base) per 100 lb. net..... | $5.00† |

Note—For less than full package quantities on bolts, screws, hot-pressed and cold-punched nuts, add extra of 10 per cent to list.
*Broken keg lots, $1.50 off list. †Broken keg lots, $6.50 net.

# Machine Requirements and Industrial Construction

## Equipment Wanted

**D. C., Washington**—A. L. Flint, General Purchasing Office of Panama Canal—will receive bids until June 27 for lathe, shaper, hack saws, chipping hammers, pipe cutting and threading machine, etc.

**Mass., Fall River**—Dept. of Public Buildings, City Hall—equipment for machine shop for Technical high school.

**Mass., Hyde Park** (Boston P. O.)—Schoolhouse Dept., City Hall, Boston—metal working lathe for Hyde Park High School, Metropolitan Ave. here.

**Mich., Pontiac**—Fisher Body Corp.—equipment for making and handling pressed metal parts for automobile bodies for proposed 1 story, 400 x 460 ft. plant.

**Mich., Saginaw**—Chevrolet Motor Co., General Motors Bldg., Detroit—miscellaneous foundry equipment for making iron castings for proposed 1 and 2 story foundry on Washington St. here. Estimated cost $2,000,000.

**N. J., Newark**—Bd. of Commissioners, City Hall, will receive bids until June 22 for welding and cutting machines, etc.

**O., Columbus**—Architectural Iron & Wire Co., 722 East Mound St., M. G. Rich, Mgr.—drill press, shears, medium size.

## Opportunities for Future Business

**Conn., Middletown**—Connecticut Power Co., 335 Main St., is having plans prepared for a 3 story, 60 x 80 ft. service building. Estimated cost to exceed $150,000. Davis & Walldorff, 17 Whitney Ave., New Haven, Archts.

**Conn., Waterbury**—Waterbury Farrell Foundry & Machine Co., 453 Bank St., is receiving bids for a 2 story, 200 x 200 ft. addition to factory at Bank and Meadow Sts. F. A. Webster, 51 West Main St., Archt.

**Ill., Chicago**—Belmont Sheet Metal Works, 2310 Belmont Ave., awarded contract for a 1 story, 50 x 160 ft. factory at 2326 Nelson St. Estimated cost $25,000.

**Ill., Chicago**—Masters Planter Co., 800 North Clark St., manufacturers of agricultural machinery, tractors, etc., awarded contract for a 1 and 2 story, 75 x 125 ft. factory at 4910 Grand Ave. Estimated cost $50,000.

**Ill., Chicago**—State Mfg. Co., 4041 South Kedzie Ave., manufacturers of polishers supplies, awarded contract for a 1 story, 60 x 100 ft. factory at 4722 Turner Ave. S.

**Ill., Sterling**—Northwestern Barb Wire Co., awarded contract for a 1 story factory. Estimated cost $100,000.

**Ind., Vincennes**—Lenehan & Dunphy, 6th and Vigo Sts., is having plans prepared for a 1 story, 150 x 280 ft. garage. Estimated cost $150,000. J. B. Bayard, Archt.

**Ia., Clinton**—Lubbers & Bell Mfg. Co., 200 North Second St., manufacturers of hardware specialities, will build a 1 story, 84 x 160 ft. factory. A. N. Morrell, Clinton, Archt.

**Ia., Davenport**—Blackhawk Foundry & Machine Co., 323 Clark St., awarded contract for a 1 story, 42 x 92 ft. addition to foundry. Clausen, Kruse & Klein, Kahl Bldg., Archts.

**Ia., Marshalltown**—Marshalltown Trowel Co., plans the construction of a 1 story addition to factory. Estimated cost $150,000.

**Ia., Mason City**—International Harvester Co. of America Inc., W. D. Price, Supt. of Constr., 606 South Michigan Ave., Chicago, Ill., awarded contract for a 1 story, 84 x 115 ft. addition to factory. Estimated cost $30,000.

**Ky., Outwood**—U. S. Veterans' Bureau, Room 764 Arlington Bldg., Washington, D. C., will receive bids until June 26 for the construction of a new shop and storage building at U. S. Veterans' Hospital here.

**Md., Baltimore**—International Harvester Co., 81 Mosher St., plans the construction of a 121 x 547 ft. plant at 25th St. and Kirk and Garrett Sts. Architect and engineer not selected.

**Mass., Attleboro**—L. G. Balfour Co., County St., manufacturing jewelers, will build a 3 story, 40 x 350 ft. factory, etc. at County and East Main Sts. Estimated cost $200,000. Noted May 31.

**Mass., Brighton** (Boston P. O.)—Watertown Cabinet Co., W. C. Burroughs, 10 Market St., awarded contract for the construction of a 1 story woodworking plant.

**Mass., Cambridge** (Boston P. O.)—Cambridge Salvage & Supply Co., 91 Broadway, is receiving bids on revised plans for a 2 story, 80 x 95 ft. factory at Broadway and Jordan Pl. Estimated cost $70,000. N. R. Willard, 402 Massachusetts Ave., Arlington, Archt. Noted May 24.

**Mass., Dorchester** (Boston P. O.)—Meisel Press Mfg. Co., 944 Dorchester Ave., is receiving bids for a 1 and 2 story, 100 x 225 ft. factory at Dorchester and Cresent Aves. H. S. Cleverdon, 46 Cornhill, Boston, Archt. and engr.

**Mass., New Bedford**—Commission of City Property, will soon award contract for a 2 story vocational school including machine and electric shops, etc. C. Hammond & Son, 179 North Water St., Archts.

**Mich., Ironwood**—William Meade & Son, will build a 1 story, 40 x 140 ft. repair and service garage on McLeod Ave. Estimated cost $25,000. Noted Mar. 15.

**Minn., Virginia**—W. T. Bailey Lumber Co., R. R. Bailey, Pres., having plans prepared for the construction of a saw mill to replace fire loss. Estimated cost $65,000.

**Mo., Fulton**—Missouri School for Deaf, H. E. Day, Supt., will soon award contract for a 3 story, 48 x 98 ft. building including manual training shops. Estimated cost $45,000. C. A. Smith,. 800 Finance Bldg., Kansas City, Archt.

**Neb., Omaha**—Union Pacific R.R. Co., 15th and Dodge Sts., is receiving bids for the construction of a machine shop, round house, etc. Estimated cost $150,000. G. J. Adamson, Asst. Ch. Engr.

**N. J., Bayonne**—Bayonne Bolt Corp., Trash Ave. and Second St., will build a 1 story, 50 x 287 ft. factory on West First St. Estimated cost $40,000. Private plans. Noted June 14.

**N. J., Haskell**—Transogram Co., is receiving bids for a 1 story, 90 x 400 ft. factory. Estimated cost $100,000. M. Thompson, 191 Joralemon St., Brooklyn, N. Y., Archt. Noted June 14.

**N. Y., Brooklyn**—Bliss Homes Inc., M. A. Lilianfeld, Pres., 44 Court St., had plans prepared for a 2 story, 120 x 172 ft. garage at Neptune Ave. and Arnold Ct. Estimated cost $150,000. Farber & Kalkin, 1746 Pitkin Ave., Archts.

**N. Y., Brooklyn**—A. L. Stucker Inc., 1783 East 28th St., had plans prepared for a 2 story, 117 x 251 ft. shop and garage at Ocean Ave. and Ave. H. Estimated cost $175,000. H. Silverstein, 26 Court St., Archt.

**N. Y., Creedmore** (mail Jamaica)—F. R. Smith, 9219 New York Ave., Jamaica, had plans prepared for the construction of storage bunkers including 1 story, 65 x 75 ft. machine shop, etc. at Bullet and Moline Sts. Estimated cost $90,000. M. Smith, 161-10 Jamaica Ave., Jamaica, Archt.

**N. Y., New York**—J. P. C. Realty Corp., J. P. Corey, Pres., Grand Central Terminal Bldg., will receive bids after July 1 for a 2 story, 75 x 200 ft. garage at 338 East 48th St. Estimated cost $90,000. A. J. Thomas, 2 West 46th St., Archt. Noted May 31.

**N. Y., New York**—One Hundred Seven West Thirteenth St. Corp., H. Weil, Pres., c/o H. Ginsberg, 222 East 42nd St., Archt., awarded contract for a 6 story, 40 x 84 ft. garage. Estimated cost $40,000. Noted June 7.

**N. Y., New York**—Willnath Holding Corp., M. Greenburg, Pres., 115 McClellan St., had plans prepared for a 1 story, 104 x 126 ft. garage at Harrod Ave. and Bronx River. L. Stillman, 1993 Jerome Ave., Archt.

**N. Y., Syracuse**—U. S. Hoffman Machinery Corp., 329 Temple St., awarded contract for a 2 story foundry on Templet St. Estimated cost $60,000.

**N. D., Bismarck**—International Harvester Co. of America Inc., W. D. Price, Supt. of Constr. 606 South Michigan Ave., Chicago, Ill., awarded contract for a 1 and 2 story service station at Fifth Ave. and Main St. here. Estimated cost $50,000. Noted June 7.

**N. D., Watford City**—H. W. Thomas, awarded contract for a 1 story, 75 x 100 ft. repair and service garage. Estimated cost $30,000. Noted May 3.

**O., Canton**—Leonard Agency Co., Harter Bank Bldg., will soon receive bids for a 1 story, 70 x 240 ft. garage on Cleveland Ave. N.W. Estimated cost $50,000. Jamieson Sales Co., 1448 Tusc St. W., lessee.

**O., Canton**—Snappy Radiator & Battery Service, 736 Cleveland Ave. S.W., plans the construction of a 1 story, 40 x 84 ft. factory. Estimated cost $40,000.

**O., Cincinnati**—Bd. of Education, C. W. Handman, Mgr., Administration Bldg., 216 East 9th St., will receive bids until June 25 for the completion of the new automotive trade school at Iowa Ave. between Morgan St. and McGregor Ave.

**Okla., Miami**—St. Louis Smelting Co., is having preliminary plans prepared for a zinc concentrating plant, 500 ton capacity. Estimated cost $60,000. Private plans.

**Okla., Tulsa**—W. C. Brown, plans the construction of an airplane factory at Sheridan Rd. and Frisco tracks near here for Spartan Aeroplane Co. Estimated cost $200,000. Private plans.

**Pa., Philadelphia**—Proctor & Schwartz, 7th and Tabor Sts., manufacturers of machinery, awarded contract for a 2 story, 50 x 145 ft. addition to factory. Estimated cost $50,000. Noted May 31.

**Pa., Pittsburgh**—Pittsburgh Park Garage Inc., Penn Ave. awarded contract for a 7 story, 60 x 200 ft. garage. Estimated cost $250,000. Noted June 7.

**S. D., Hot Springs**—Black Hills Motor Co., G. H. Hemminger, Pres., awarded contract for a 2 story, 50 x 130 ft. repair and service garage at Chicago Ave. and Seventh St.

**Tex., Saginaw**—Atchison, Topeka & Santa Fe Ry. Co., 80 East Jackson Blvd., Chicago, Ill., plans the construction of yards and shops here. Estimated cost $1,000,000. M. C. Blanchard, Amarillo, Ch. Engr. (Western Lines).

**Wis., Milwaukee**—Briggs & Stratton Corp., 1047 13th St., manufacturers of automotive electrical equipment, switches, etc., awarded contract for a 60 x 120 ft. addition to factory. Estimated cost $35,000.

**Wis., Reedsburg**—H. J. Vogts Co., (Chevrolet Dealers), plans the construction of a 2 story, 82 x 99 ft. garage at Main and Water Sts. Estimated cost $40,000.

**N. F., St. Johns**—St. Johns Nail Mfg. Co., plans the construction of a galvanizing plant. Estimated cost $50,000.

**Ont., Toronto**—Canada Metal Co. Ltd., plans the construction of a plant on Viner Front area.

**Ont., Toronto**—Caresfield Electric Works, 160 Geary St., plans addition to plant. Estimated cost $10,000.